



### **The Gold Inlay.\***

**J. V. CONZETT, D.D.S.**

In order to do good work it is necessary to have good instruments and instruments of the proper kind. I have been so frequently asked for a list of the instruments that I use and advise that I will again publish the list that I have given on a former occasion, with such additions that the subject under discussion will call for. They are as follows:

#### **Hoes:**

Black's	8—3—12
	6—2—12
	12—5—12
	10—4—6
	14—6—6

#### **Chisels:**

Wedelstaedt's	39
	42
	43
	44

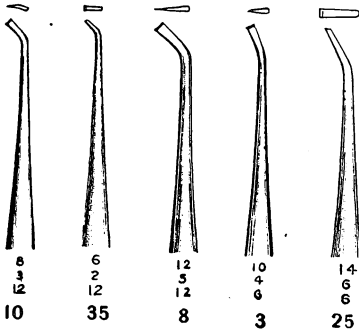
#### **Enamel Hatchets:**

Black's	20—9—12	Right and Left
	15—8—12	" " "
	10—6—12	" " "

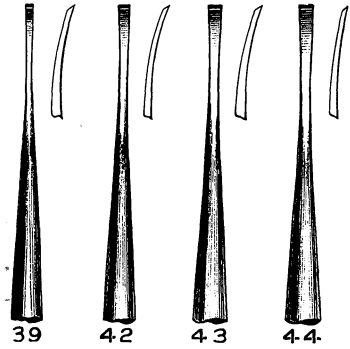
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# ITEMS OF INTEREST



Black's Hoes



Wedelstaedt's Chisels

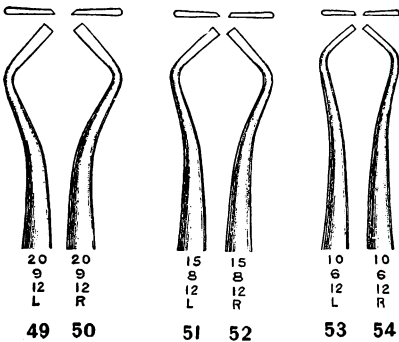
Gingival Margin:

Trimmers:

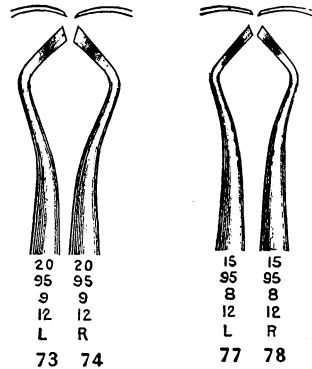
Black's 20-95-9-12 Right and Left  
15-95-8-12 " " "

Burs:

Round	1	2	4	7
Inverted Cone	35	37	39	
Fissure	57	58		



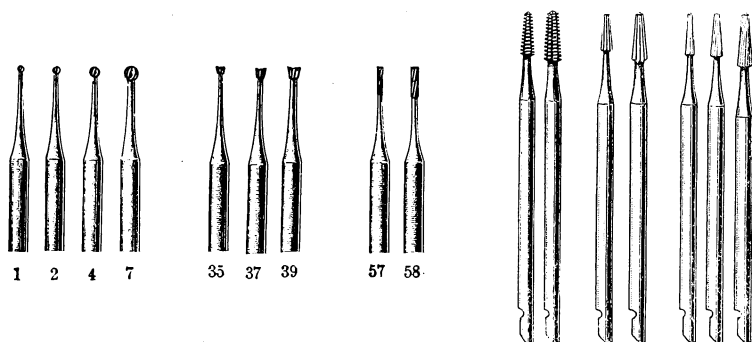
Black's Hatchets



Margin Trimmers

The Wedelstaedt's chisels may be beveled in the reverse way with a great deal of advantage in many positions; indeed, I think that I use the reverse bevel more than I do the ordinary one. The same thing may be done with the 14—6—6 hoes; it is a good plan to have many of the same instruments cut with the ordinary and the reverse bevel.

In addition to the gingival margin trimmers that are listed, a very valuable pair may be made by beveling a pair of 12—6—6 hoes to make right and left trimmers, as illustrated. The same may be done with two of the smaller Wedelstaedt chisels.†



Cavity Burs

Inlay Burs

In addition to the burs mentioned there have recently been placed upon the market a number of inlay burs that are admirably adapted to the preparation of cavities for inlays. They are in the shape of elongated cones, and can be obtained from any of the dealers. It would be well to have a number of the different sizes always at hand. They come in the cross-cut as well as the ordinary blades, and I find the cross-cut burs very convenient for many cases that necessitate the cutting of the enamel.

† "Formula names have been adopted for the cutting instruments, which describe each individual instrument so accurately that each one may be known when its class and formula are spoken or written. This is necessary in order that a teacher or writer may be understood when speaking of the use of particular instruments, and that students and dentists may speak intelligently of these matters to each other.

"These formula names are formed upon the same principle as that used by the carpenter in naming his chisels or augers, as half-inch chisel, one-inch chisel, three-quarter-inch auger, etc. But to sufficiently describe the point of an excavator so that the particular instrument will be known at sight, it is necessary to give three measurements. In all of this, the metric system of measurements is used and there are three distinct units; one for width of blade, the tenth of a millimeter; one for length of blade, the millimeter; one for angle of blade, the centigrade. We give first the class name, as hatchet, hoe, spoon, etc., and then give the formula of the point or working part. This formula consists of the measurement, first, of the width of the blade in tenths of a millimeter used as the unit; second, of the length of the blade in millimeters; third, the angle of the blade with its shaft or handle, in centigrades, or hundredths of a circle. Note particularly that the width and length make up the size of the blade. Also, in order that the individual instruments of the set may be easily learned and remembered, we confine the set to a regular range of sizes and range of angles of blades that will give an orderly set for practical use and a sufficient variety of forms. In this way, unnecessary multiplication of forms is prevented." *Operative Dentistry*, G. V. BLACK.

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For finishing, the Gem stones of various sizes are the best that I have found for the purpose, followed with a fine vulcarbo stone. The operator will need a few wax carvers to trim the wax model to form, and these may be obtained to suit the individual taste of the operator.

### **Inlay Pattern Wax.**

The best wax is undoubtedly the Taggart, but it is doubtful if that can be obtained at the present time, more is the pity. But I hope that things may soon be so arranged that Dr. Taggart will get his dues, and the dental profession will then be able to fully realize all that his genius has to give us.

The next best wax that I have found for the purpose of making the pattern for an inlay is the black wax furnished by the Consolidated Dental Manufacturing Company. It is hard at the temperature of the mouth and carves to a good, clean margin.

### **Investment Material.**

The investment material that has been furnished by Dr. Taggart was the ideal, but until we can again obtain that we will have to do with the next best, which can be made by the dentist himself with three parts of very finely pulverized silex and one part of plaster; these parts to be by measurement. The silex and plaster must be carefully mixed, and to do this it is well to obtain an ordinary flower sifter, mix the two ingredients together, and then run them through the sifter three times, when they will be about as perfectly mixed as it is possible to get them.

The best casting device, in the opinion of the writer, is the Taggart, which is the "machine perfect" for the operation, but it is not the only way that a casting may be made. There are upon the market an innumerable number of machines, and the dentist may choose the one that his fancy dictates. The Taggart stands at one end of the list and the home-made steam pad at the other; any method that will furnish pressure upon the molten gold at the proper time will produce a casting of greater or lesser perfection.

### **Situations Suitable for Gold Inlays.**

In the opinion of the writer the inlay is not indicated in every place. He is not one of those who believes that the time has yet come to throw away the gold pluggers. It might be well to consider the indications for a filling and for an inlay, and let me say at the outset that no man is capable of telling any other man where or when he is to use any material or method. The personal equation of the operator plays such an important part in the problem that it is impossible for any one man to tell any other where or when he *must* use any method or material. That must be determined by the ability of the operator to use the material or the method.

Other things being equal, however, I will attempt to analyze the situation and indicate the places where the inlay is to be used to the exclusion of the filling, and, on the other hand, it will not be out of place to indicate the preference that should be given to the filling in certain locations under certain conditions.

First, let me say that there are, confessedly, some men who cannot make a good gold filling, no matter how hard they try, and to such men the gold inlay is a boon, and they should use it in all places. That man is not honest who will adopt a method that he knows he cannot properly use and fails to give his patient the best service, and whether the other fellow thinks that he is using the wrong material in the wrong place or not, if he is rendering his patient a service with that material that he could not with any other, that is the material for him to use.

The gold inlay is indicated in all cavities that cannot be perfectly filled with gold by the operator that has the operation in charge. It is pre-eminently indicated in all cases that will cause too great a strain upon the nervous system of the patient under consideration whether the operator is able to make a perfect operation in the position or not. It is not profitable to make a perfect operation and then to lose the patient, because the strain of the operation was so great that the patient was made ill, and thereafter consistently refused to have any further dealings with the operator who produced the strain. There are many delicate ladies who cannot endure the stress necessary to make a large gold filling in the cavities occurring in the back teeth, and it is not wise to attempt to make them suffer when a method as good as the gold inlay can take away a very large share of the strain.

The gold inlay is indicated in that large class of cases that has heretofore been filled with amalgam, or crowned, because the fact that the tooth was not sufficiently strong to stand the shock of the necessary malleting.

The gold inlay is indicated, let me repeat, in all cases where the technique of the operator is insufficient to perfectly fill with gold, for "A poor gold filling is about the poorest tooth-saver that we have."

The gold inlay is contra-indicated in all of those cases that can be perfectly filled with gold, to the conservation of any considerable amount of tooth structure. That is, it is necessary in some cases and in some positions to cut away a good deal more tooth structure for an inlay than it is for a filling, and in all those cases, where a filling is not contra-indicated for other reasons, the filling should be used, for it is always inexcusable to cut away any more tooth structure than is necessary for the salvation of the tooth.

This is particularly true of the six anterior teeth, unless we except

the cavities involving the distal surfaces of the cuspids. In the cavities occurring in the proximal surfaces of the incisors and the mesio-proximal surfaces of the cuspids a gold filling is better than an inlay. Nevertheless, if the operator does not possess the ability to save these teeth with fillings, by all means use the inlay, and for such men we will, in the proper time and place, take up the cavity preparation for such cases.

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## Nervous Exhaustion and Its Attending Dangers.

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By J. GRANT PEASE, D.D.S., New York.

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The pursuit of happiness is the aim of all mankind. All men seek occupation with this end in view—directly or indirectly.

A man enters a profession, either because his environment leads him into it, because he loves its study and operation, or simply as a livelihood. Only he who really loves his profession can make a success.

It, however, is true that an individual can become so devoted to an occupation as to lose "The wide horizon's grander view" which is needed to energize, clear, and relax the mind.

No professional man needs to guard himself more, nor indeed as much, as the dental practitioner, for the following self-evident reasons:

Personal contact with various temperaments.

Difficult instrumentation due to obscure location of tissue needing attention.

Continuous (all day) guarded care in the use of instruments.

Strained yet inactive physical positions.

Problems requiring inventive instinct and judgment.

Care to cover all practical details which may be of advantage toward the permanency of an operation.

Responsibility and difficulty in securing artistic and natural appearance with practical strength.

Besides, this professional man should be a gentleman, a diplomat, and a scholar, with a knowledge of business methods in order to conduct his office on a systematic and a profitable basis in behalf of his own and his patients' welfare; not forgetting to retain sufficient time for study and advancement in dental science.

The depletion of vital energy is so insidious  
**Overtaxation.** that a man unacquainted with and uninstructed as to the mental signs does not realize what is occurring. The process is so slow that he does not recognize that his sleep

is not so refreshing as it was, and should be, and that he tires more readily. He attends to his professional duties under the same pressure, necessitated by his practice, but gradually using more will power without realizing it. He is apt to forget, during the years of this undermining process, the actual difference in the standard of his health.

Ignorant of what is occurring, he unconsciously employs more and more will power to take the place of normal endurance. The day's duties over, instead of a normal desire to rest, a nervous reaction sets in. Sleep is out of the question. A fear that he is "going to pieces" engenders a need to hold on to himself. The slightest mental or physical exertion now exhausts him. Beauty and sunshine are things of the past. Entertainment cannot penetrate the armor of fear and depression. Suddenly a physical ailment may come which draws the curtain on this sad picture.

Many of our most conscientious practitioners have gone, to some extent, through such an experience. Some awakened to the danger in time; others did not halt before they reached the maelstrom, where there is no returning. This is not an overdrawn picture. Practically all of our old reliable practitioners are acquainted with this danger, and the wise are keeping a mental balance by proper regulation.

Having had a personal experience, I can speak from practical knowledge. Fortunately, youth and financial ability enabled me to pull out of the danger zone unharmed except by the loss of a large part of my practice, which I subsequently regained.

**Author's  
Method.**

First. I do not postpone all my recreation till after office hours. I incorporate pleasure in my practice, to a practical extent, and by this means my patients are benefited as well as myself, inasmuch as it removes the tendency of repugnance to operating which seems uppermost in so many minds.

In my reception room I have a piano, to which is connected a Tel-electric player. This is operated by electricity and is self-expressing, rendering the compositions identically the same as by hand.

I have had this player for a number of years and it would be like losing a friend to part with it. At opportune moments a Beethoven sonata or symphony is certainly refreshing, and relieves the tension which one may experience during a long day of operating.

I believe many do not realize what they are losing in being deprived of the joy and relaxation which good music gives—just at the right time. It is truly said that "Music hath charms to soothe the savage breast." I am thankful to say I have proved this in relation to myself and many of my patients. Thus I save, to a large degree, the otherwise needed periods for recuperation.

## ITEMS OF INTEREST

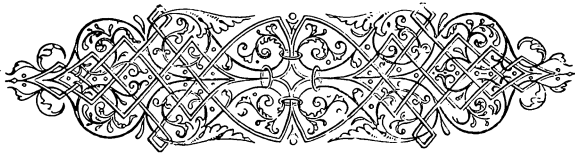
Secondly. I arrange appointments so as to allow full time for operations, thus relieving the strain of "hurry to be ready for the next patient." This, I believe, is imperative if a man expects to retain his mental equipoise and vigor needed to do his best. The New York Telephone Company has found it necessary to relieve the mental strain of busy operators by special periods of rest each day. Does not the alert and careful dental practitioner owe it to himself and his patients that he retain the clear and well-balanced mind so needed in delicate and intricate operations? Personally, I feel that many imperfect operations are the result of lack of equilibrium, due to hurry and insufficient relaxation.

Finally, all instruments and materials are arranged in an orderly manner and are easy of access.

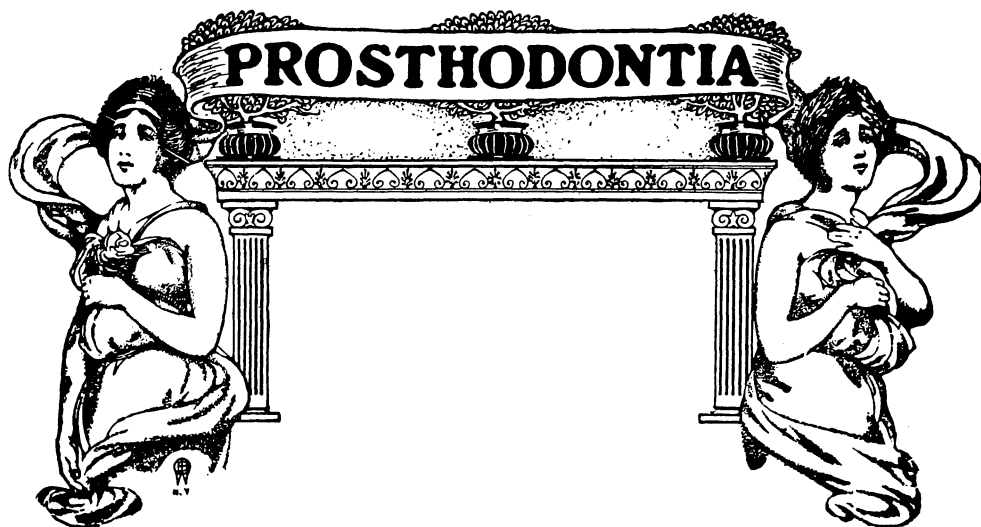
I have a capable assistant to aid me at the chair, as well as for clerical work, which relieves me of many details.

Regularity and order must be the watchword, for system reduces labor, prevents petty annoyance and accelerates action. All of which conserves energy and maintains a co-ordinate mind.

If my remarks carry any suggestion which will be of benefit to some who may be working at a disadvantage I shall feel repaid.







## Construction of Metallic Molar Crowns.\*

BY HERMAN F. CHAYES, D.D.S., New York.

Let us assume that we are neophytes so far as any knowledge of crown work is concerned, and let us further assume that we have spent a period of careful thought in trying to determine just what crown work really is, and furthermore that we have reached this conclusion as regards its definition.

The crown, in relation to teeth, is that part of the dental organ which, covered with enamel, usually rises out of the gum, extends into the oral cavity, seeking occlusal relations with its opposing and approximal relations with the adjoining members.

"Crown work in relation to dental organs is consequently a part of dental science and dental art; that part of it which teaches of the restoration of partially or totally broken down tooth crowns by scientifically constructed, artificial substitutes."

### Requirements of a Crown.

A case presenting, which calls for the restoration of a natural crown, we know what is required of us, or rather we know that we must construct a crown, to restore the broken down tooth.

Let us carefully consider just what are the requirements of a crown and let us put them down in the order of their importance.

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## ITEMS OF INTEREST

1. We must bear in mind that the artificial crown must not in any way encroach upon the soft tissues.

2. At no point of its gingival circumference shall the continuity between artificial crown and dental organ be broken.

3. The artificial crown must restore to the broken down tooth all the means of exercising the functions which nature intended it for: mastication, triuration, incision and prehension.

4. Whether it be a posterior or an anterior crown, its phonetic service to the vocal organs must not be diminished, interfered with, nor made doubtful.

5. It must be perfect in its occlusal relations to the teeth opposing it, and

6. It must be perfect in its relations with the teeth abutting it on either side.

7. It must be in perfect harmony with the soft tissues of the buccal cavity, the cheeks, the lips and the tongue.

8. It must be so contoured that if divided into three parts, gingivomorsally (horizontally) its greatest circumference must be at the gingival plane of the morsal third and its smallest circumference at the gingival plane of the gingival third. (Figs. 1 to 8.)

9. The preparation of a tooth for the reception of a scientifically constructed artificial crown includes the denuding of all its walls so that they be left minus enamel.

10. The proper preparation of a tooth for the reception of a crown implies the extirpation of the pulp (if vital) under cathaphoresis, pressure anæsthesia or nitrous oxide; the proper treatment and filling of the root canals, and such dressing down of its walls and morsal surface as will permit the placing of hood upon it, the vertical lines of the walls of which are at right angles to the horizontal plane of the gingival third of the tooth, regardless of its relative occlusal position within the buccal cavity.

The tenth rule with regard to extirpation of the pulp has but one exception, which will be discussed later.

Crowns may be divided into three distinct classes: (a) Metallic, (b) non-metallic, and (c) combination crowns.

**Artificial  
Crowns  
Classified.**

Metallic crowns have a limited application because of the objectionable obviousness of their artificiality. They should rarely, if ever, be used on any tooth anteriorly to the first molar, although in cases of extensive restorations (to be con-

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sidered later on), it becomes advisable to resort to metallic crowns as far anteriorly as the second bicuspid.

The construction of a perfectly fitting, non-irritating crown was, until a little over two years ago, quite an arduous process. With the advent of the Taggart machine and the Taggart casting method, it has been rendered not only more certain and scientifically more correct, but also has been much more simple and far more artistic.

The old "text-book" perfectly fitting, non-irritating crown, no matter what the method, is a delusion. No one can take a 28 or 30 gauge plate of 22 karat gold and fit it around a molar tooth, nor, indeed, around any tooth, in such a manner as to leave the continuity between metal and tooth at the gingival plane unbroken. (Fig. 9.)

Attention is especially called to the prevailing faulty method of preparing the root end in a cone-shaped form.

The conception of the result from such preparation was that the more the shell crown was forced down upon the cone-shaped stump, the tighter it would fit upon the gingival plane, and while this was really the case, this result was usually accompanied by an unlooked for by-product or other result, namely, that of so stretching the extremely thin gingival edge of the crown, as to cause the metal to curl outward upon itself, with the consequence that from the outset the soft tissues were encroached upon at the most vulnerable point.

A practical experiment performed outside of the mouth upon any technic tooth prepared in cone-shaped manner will convince the reader that this is true.

We know now that a feather edged ring or hood of metal stretched over and down upon a cone-shaped stump will curl outward upon itself and away from the stump, in proportion to the degree of pressure applied at the top of the ring or hood. We can also readily understand that the greater the curl, the greater the break in the continuity between metal and tooth and the greater the irritation to the gingiva and periodontal membrane; in short, the more doubtful the result.

The position of the tooth to be crowned being normal from an occlusal point of view, it is so dressed down as to lose all of the morsal third, down to the morsal plane of the middle third. Bell shaped portions of all surfaces, distal, mesial, labial or buccal, and palatal or lingual are removed with carborundum stones, and discs of various sizes. The stump is finished with sand paper discs and care is taken to so complete the dressing down, that the walls enclose a figure, each vertical line of which is at right angles to the gingival plane of the gingival third of the tooth.

### Construction of a Metallic Crown.

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The free gingival border is retracted away from the stump and the subgingival circumference of the tooth is dressed down with very small stones and curved chisels, so as to be smaller in circumference than the morsal plane of the middle third; the depression thus made must be no greater than the thickness of 38 gauge (Brown & Sharp) plate.

We are ready for the construction of a hood to fit the properly treated and filled and properly dressed down stump.

### **Requirements for Hood.**

The metal used for this purpose must possess the following qualities:

1. Resistance to disintegration by the fluids of the oral cavity.
2. It must be of at least a third again as high a fusing point as pure gold.
3. It must be almost equal to pure gold in ductility.
4. Its molecular strength must be such as to resist tearing even when very thin.
5. It must be as pliable as pure gold and quite as adaptable.
6. Last, but not least, the toleration of it by the tissues must be beyond question.

A 38 gauge sheet of pure platinum answers all these demands ideally, and we shall use it for the purpose of constructing our hood.

### **Construction of Hood.**

A wire measurement is obtained from around the morsal plane of the middle third of the stump, and the length of the wire is marked off upon the sheet of metal, with a pair of calipers. The height of the highest point on any of the surfaces is found and this, the width of the metal required, is marked off upon the sheet. A sixteenth of an inch is added to this width to allow for that part which is to extend beneath the free margin of the gingiva.

The strip of metal thus marked off is cut from the platinum plate and the collar is formed and joined by soldering the edges with a 25% platinum solder.

### **Platinum Solder Formula.**

The formula for this solder is as follows:

To 360 grains of pure gold, which has been fused and kept at a boiling point in a carbon crucible, are added 120 grains of exceedingly thin pure platinum, the latter having been cut into narrow strips and gradually fed into the boiling gold.

When the boiling mass has taken up all of the platinum the intense

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heat is kept up until a point of incandescence has been reached and a light produced which is too intense for the eye to tolerate.

It is imperative that the operator wear blue or amber-colored glasses to protect his eyes.

The molecular union of the two metals having taken place, the ingot is allowed to cool somewhat and is then plunged into water, and thence into an acid bath, for the purpose of proper cleansing.

It is flattened upon an anvil and then rolled down to a 26 gauge thickness. The plate thus obtained gives us a 25 per cent. platinum solder, which should be properly marked in several places and is ready for use. This solder, if kept thoroughly clean, requires no flux.

### **Completing the Hood.**

The collar is now placed upon the tooth and care is taken to so trim the gingival circumference that it will conform to the gingival eminence or border of the tooth. The collar is allowed to pass beneath the free margin of the gingiva to the extent of one-sixteenth of an inch, provided for this purpose, and the part so reaching beneath the free margin of the gum is marked with a sharply pointed instrument, the mark extending all around the collar and usually conforming in outline to the subgingival border of the tooth.

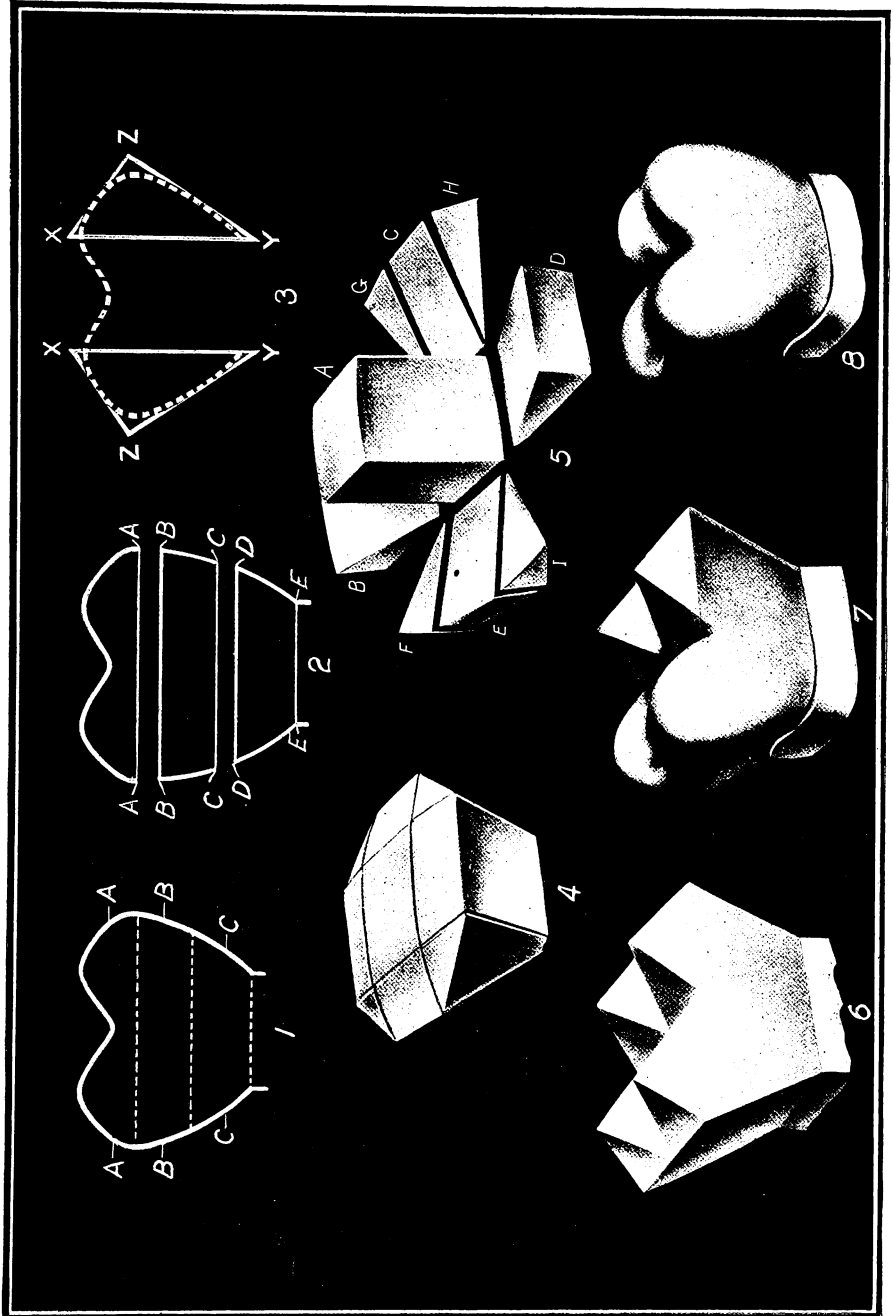
A piece of 38 gauge platinum plate of the proper size is now soldered to the collar and a 20% platinum solder is used for this purpose, so as not to unsolder the point previously made at the union of the collar planes. The formula for this solder consists of 384 grains of pure gold to which are added 96 grains of pure platinum. The method of procedure in the making of this solder is exactly the same as the one outlined above for the 25% material.

We now have a collar which, though fitting perfectly, slips on or off the tooth, as we may desire, with the greatest ease. It is of the exact height of the stump, surrounds this stump, and protects without in any way irritating the soft tissues.

The top having been joined to the collar, the surplus, if any, is trimmed off, giving us a flat-topped hood which fits the stump with the precision of a barrel over a syringe piston, the hood representing the barrel and the stump the piston of the syringe.

### **Contouring the Hood.**

The complete hood (Figs. 10 and 11, a) is now tried in the mouth; it will be found to fit perfectly and will go down beneath the free margin of the gum to the mark made upon the collar by the instrument. The hood is now removed from the tooth and dried with a blast from the hot air syringe.



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The hood is now grasped with a pair of tweezers slightly heated in the Bunsen or alcohol flame and allowed to sink into a piece of inlay wax somewhat larger in circumference than the hood proper.

The body of wax is softened by waving it in the alcohol flame and the wax covered hood is replaced upon the stump, gently forced home, and the patient is directed to bring the lower teeth into proper relation with the two upper ones.

The patient is told to triturate upon the wax until the normal occlusion is obtained.

A spray of ice water is then directed upon the wax-covered hood and it is removed from the mouth.

With the proper carving instruments an ideally shaped cusp is produced and the contour of the entire tooth is reproduced upon the wax-covered hood. (Figs. 10 and 11, *b.*)

## Explanation of Plate.

Fig. 1. Molar crown divided horizontally into thirds.

- A.A. Morsal third.
- B.B. Middle third.
- C.C. Gingival third.

Fig. 2. Same, with thirds separated.

- A.A. Gingival plane of morsal third.
- B.B. Morsal plane of middle third.
- C.C. Gingival plane of middle third.
- D.D. Morsal plane of gingival third.
- E.E. Gingival plane of gingival third.

Fig. 3. Geometric construction of contours of molars.

A line drawn from highest eminence of cusp, to a point on the circumference of the tooth at its neck (X.Y.), becomes the hypothenuse of a right-angled triangle (X.Y.Z.), the right angle of which will lie opposite the gingival plane of the morsal third. X.Y.Z., the right-angled triangle. X.Y., the hypothenuse. X.Z., base of triangle. Z.Y., altitude of triangle.

Fig. 4. Geometric solid figure, properly triangulated, from which molar crown may be carved.

Fig. 5. Same with component sections separated.

A. Central rectangular pillar. B. Mesial wedge-shaped section. C. Lingual wedge. D. Distal wedge. E. Buccal wedge. F. Mesio-buccal angle section. Triangular pyramid inverted. G. Mesio-lingual pyramid. H. Disto-lingual pyramid. I. Disto-buccal-pyramid.

Fig. 6. Geometric figure, showing second stage of carving molar crown, the cusps appearing as quadrangular pyramids.

Fig. 7. Third stage. One-half of crown carved out.

Fig. 8. Crown completed.

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The wax is allowed to cover the platinum hood down to the line marked off as extending beneath the free margin of the gingiva.

With the aid of a piece of linen dipped into alcohol the wax crown is polished and is ready to be attached to the sprue and subsequently to be invested and cast.



FIG. 9

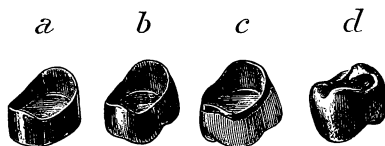


FIG. 10

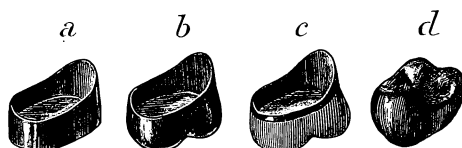


FIG. 11

Fig. 9. Shows continuity of band and root surface.

Fig. 10. Upper second molar technique.

Fig. 11. Upper third molar technique.

## The Proper Contour of the Crown.

If every surface of a molar except the morsal surface be ground at right angles to the gingival plane of the gingival third, in other words, if taking the circumference of the gingival plane of the gingival third as a guide, we ground the walls of the tooth so that a wire measurement taken around the gingival circumference will pass easily up and down upon the tooth, we would find that the highest points of the morsal eminences are in line with some point on the gingival circumference. Now if we bear in mind the fact that



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the greatest circumference of a tooth is at the gingival plane of the morsal third and then form a right-angled triangle, the base of which is formed by a line dropped from the highest morsal eminence to a point of intersection with the line rising from the gingival circumference to the gingival plane of the morsal third, the latter line is the line of altitude of the right-angled triangle while its hypotenuse is formed by the direct line dropped from the morsal eminence to the gingival circumference as illustrated. (Figs. 1 to 8.)

This holds good for the contouring of the four surfaces of the tooth and an additional guide for the approximal surfaces is that the crown must be built out so as to be brought into juxtaposition with the abutting teeth in such a manner that the crown approximates the adjoining tooth at its greatest circumference and so that the approximal line of the gingival plane of the morsal third, being the arc of a circle, the center of which lies external to the crown, that arc is tangent to a straight line drawn between the crown and the tooth adjoining it.

The artistic skill of the prosthodontist is now called into play, the angles must be rounded out so as to bring out the curved line of beauty, conforming, however, in their direction to the geometrical lines laid down above.

## Investing and Casting.

The investment of the crown in the casting compound requires great care, first in the mixing of the compound, and second, in the imbedding of the crown in such a manner as to avoid all possi-

bilities of air bubbles.

Dr. Taggart has made this so plain that the process requires no present description.

It is best to attach the sprue wire to that point of the wax crown which presents the greatest thickness of wax.

When the compound has set to the proper hardness, the crucible former and sprue wire are removed. A Roach carver, the point of which has been lengthened, is heated and introduced in order to dispose of the greater part of the wax.

Unless this is done the casting compound will be materially weakened, due to the permeation of it by the wax.

The heat is slowly applied until all evidence of moisture has disappeared, when the temperature is raised and kept up until the flask and contents are hot enough to enable the operator to look through the mass.

It is essential to follow the latter direction because it is thus only that the platinum can be put into the proper molecularly receptive condition for the gold to be cast upon it.

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### **Alloy for Casting Crowns.**

I use an alloy consisting of 95% of pure gold and 5 % of pure platinum for the crown casting when it is to stand alone

In case the crown is to be used as an abutment for a bridge an alloy of 90% pure gold to 10% platinum is preferable because of its greater strength and consequent resistance to the force of mastication.

It must be remembered that, in the fusing of all the alloys mentioned in this section of this paper, a nitrous oxide blowpipe is used in order to furnish sufficient heat to accomplish the result desired.

A pressure of 10 lbs. is enough for the casting of crowns.

### **Finishing.**

As soon as the casting has cooled somewhat, the lever of the Taggart machine is released, the flask is removed and plunged into water, the crown is cleansed with a brush and water and then thrown into a hydro-fluoric acid bath in order to rid it of all silica.

We will find upon inspection that the gold reaches to the gingival plane of the gingival third and there continues for about one-sixteenth of an inch a piece of pure platinum which, upon the crown being set, surrounds the stump sub-gingivally. (Figs. 10 and 11, c.)

With the use of paper discs the crown is polished. Starting with coarse cuttle fish we finish with the finest crocus discs and finally apply point and ball engine polishers.

### **Setting Crown.**

The finished crown (Figs. 10 and 11, d) is tried in the mouth and upon being found perfect we proceed to set it with oxyphosphate.

All appliances, such as clamps, napkins, gutta-percha, instruments, etc., as well as cement slab with the powder and liquid upon it must be in readiness before the patient is put to any inconvenience.

The clamp is adjusted upon the tooth adjoining, if one be present, otherwise upon the stump, and well forced down subgingivally, cotton rolls or napkins are adjusted and the tooth thoroughly dried.

It is then bathed in bichloride solution, 1 to 250, while the saliva ejector is in place. The cotton rolls are changed, the tooth dried again in an alcohol bath, when the cotton rolls are changed for the last time before the setting of the crown.

The cement is thoroughly mixed and spatulated and a small quantity is inserted into the crown, which has been kept warm enough to be comfortably held with the fingers.

# PROSTHODONTIA

The crown is gently set upon the stump and with a slightly rocking motion it is forced home.

A crown such as the one described above can go down in the proper manner only, and as soon as it ceases yielding to pressure it is best to insert a cork of suitable size for the patient to close down upon and hold same in position over the crown until the cement begins to crystallize.

While this process is carried out, the napkins or cotton rolls are changed from time to time, the saliva ejector is in place and every precaution has been taken to exclude all moisture.

With right and left burnishers the free edge of one-sixteenth of an inch of platinum is burnished into the subgingival depression of the stump.

The patient is relieved of all clamps, saliva ejector, etc., also the surplus cement, if any be present, is removed, a spray of warm water is directed upon the gingivus surrounding the crown and the adjoining teeth, the parts are subjected to a brisk finger massage, in order to stimulate circulation, and the patient is dismissed.

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## Practical Hints on Crown and Bridgework.

BY DR. FRED. S. BELL, St. Louis, Mo.

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As crown and bridgework constitute so large a part of a dentist's daily efforts, it seems to me that too much cannot be said of the work in the journals devoted to the betterment of our profession; therefore, I will offer just a few hints on how to overcome some of our mistakes.

One of the most common mistakes is not trimming the crown band out at the inter-proximal spaces, to allow for the gum septum. Please do this; otherwise you will always have a red or swollen septum, usually an exudation of pus. No part of the crown band should be deeper under the gum than about half of what we generally concede the free margin to be, for if it is, the gum around a crown so set will never be normal, and that means the ultimate failure of that piece of work. In fitting the crown band, always cut the strip of gold for the band slightly shorter on the gingival side than the measure of the tooth indicates, and, of course, always flare the band toward the occlusal surface and perfect contact points. After cutting out band to allow for gum septum, you will find that whatever you have cut the band short will be given you by this trimming out. If, however, you find the band loose, cut the band apart

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where soldered, take off a piece and resolder. Do this until you need to force the band slightly to get it into place, then you will have the band properly fitting at gingival border. Never set a crown while the gum is sore, for it is not only painful, but you are almost certain to find the crown too deep or too shallow after the gum has healed. Never set a bridge until after the patient has worn it several days, because it will then properly adjust itself, and no matter how carefully you may have fitted the crown bands, you will find the abutment crowns need trimming at the gum line, usually at the septum.

Another most important thing about crowns and bridges is the proper occlusion. Always be sure the bites are thoroughly chilled before removing, and in taking bite for a very long bridge, place modeling compound between abutments on gums, which gives the wax a hard surface to rest on, and produces an accurate impression of occluding teeth. The modeling compound should then be placed on the model with bite until it is placed on the articulator.

Never fill a tooth, to be crowned, with cement when the decay is anywhere near the gum line, because that cement is sure to become disintegrated by the fluids of the mouth, and some day that crown will either come off because of the disintegrated cement, or the tooth will need to be removed entirely, because of recurring decay under the crown. In such cases, use alloy.

Never carve the gum on your model to set in dummy of facing. Grind them to fit the gum, because if you do not, when fitting the crown you will have to do so, or some day wish you had, when the patient comes back with sore or inflamed gums from the constant irritating pressure of those dummies.

In using inlays for abutments, which we so often do in short anterior bridges, remember to bring the inlay well around to labial of tooth or side next to dummy, and also slightly under the free margin of gum, so that this part of the tooth most likely to be unclean will have perfect protection in any event. Lastly, do not forget after the crown and bridge is set, and the cement thoroughly hardened, to carefully remove every particle of excess cement from under the free margin of the gum and elsewhere. Neglect to do this is very common and very detrimental.

While some bridges are a failure because of their frailty, most of them fail because of the non-observance of the foregoing precautions. Remember, then, the thing most important in crown and bridgework is to fit your crowns and dummies so that the gums can assume and retain their normal condition, and thus many of your crowns and bridges will not be a source of distress instead of a comfort, or a failure instead of a success.



## Death of Pulps Due to Tooth-Movement.

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By J. P. BUCKLEY, Ph.G., D.D.S., Chicago.

*Read before the American Society of Orthodontists, at Denver, Colo.*

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In presenting for your consideration the subject of death of pulps due to tooth-movement I desire first to acknowledge my indebtedness to Dr. Ottolengui and to your secretary, Dr. Kemple; to the former for the encouragement and assistance given me in the preparation of the paper, and to the latter for sending a letter, with a list of questions enclosed, to most of the men engaged in the practice of orthodontia in Europe, Canada and the United States, from which source much of the data contained in this paper has been obtained. I also desire to take advantage of this opportunity to thank the various men who replied to the above-mentioned letter, as I did not take the time to reply to each individually.

I must admit that when I finally accepted the invitation to present this paper I did not experience at once that enthusiasm which generally characterizes my work; but as the letters came in and I studied the opinions on this subject from the men who have been actively engaged in orthodontia, I gradually became interested, and before the paper was completed my enthusiasm could not have been greater had I been a full-fledged orthodontist.

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My personal experience in the correction of irregularities of the teeth is very limited, being confined to the first two or three years of my practice; yet, so far as the subject of death of pulps is concerned, it was sufficient to include one tooth, an upper lateral incisor, the pulp of which died from too rapid movement, and this I find is more experience than many of you have had in your several years of practice.

The number of replies which I received from the letters sent by your secretary was seventy, and the first part of this paper will deal largely with these answers. Coming, as they do, from men of both or all schools of orthodontia, and who have had from five to, in many cases, thirty or more years of experience, we should arrive at some definite conclusions.

The questions submitted to be answered here follow:

### Questions Submitted.

First. Have you ever had the pulps of any teeth die during orthodontic work?

Second. Can you state which teeth suffered in this respect?

Third. Did you attribute such death to the movement of the teeth?

Fourth. Was there any history of traumatism or accident to the tooth while loosened up by the forces applied in orthodontia?

Fifth. Do you believe that any particular tooth is more likely to suffer in this way than any other teeth in the arch? and, if so, why?

Sixth. Have you had any teeth die as the result of rotating teeth in their sockets?

Two more questions were suggested by Dr. S. H. Guilford and have been answered incidentally by various men, including himself. These questions follow:

Seventh. What form of movement is most likely to result in pulp devitalization?

Eighth. At what age is devitalization most likely to occur?

### Replies.

Of the seventy men who returned answers to the above questions, thirty have never had the pulps of any teeth die as the result of orthodontic work, while forty have had the pulps of one or more teeth die. The teeth thus affected include upper central and upper and lower lateral incisors, upper and lower cuspids, upper bicuspid, and lower first molars. Of the forty, twenty-four have had the pulp of one or more upper central incisors die; thirteen have had one or more lateral incisors thus affected—all upper except two; three have had the pulp of one or more upper cuspids die; one has had the pulp of lower cuspids die; two have had the pulp of

one lower first molar die; while only one had the pulp of a single upper bicuspid affected.

Thus we learn from the experience of these men, which, I think, can well be taken as a standard, that the upper central incisors are most likely to suffer in this respect, and next to these come the upper lateral incisors. In fact, death of the pulp in all other teeth occurs so infrequently in orthodontic procedure that they can almost be dismissed without further attention. The two lower first molars reported to have had the pulps die, both carried large amalgam fillings, and the death was attributed to possible infection from the cavities, before the fillings were inserted, rather than from the tooth-movement. In the case of the one bicuspid, little history was given, except that the patient was over twenty years of age. No history was given for the death of pulp in lower cuspids. In the cases where the pulps of the three upper cuspids were affected the patients were all over twenty years of age, and in one case (twenty-six years old) the expansion from tip to tip of cuspids was about 1.4 inches, the time consumed was five and one-half months, and, so far as the operator was able to determine, the devitalized cuspid was not moved further than the one which retained its vitality. The chances are, however, that while the tip of the affected cuspid may not have been moved further than the tip of the unaffected one, there must have been a greater movement in the region of the apex of the affected tooth. In reporting the death of the pulp in a lower lateral incisor one operator referred to the fact that there seemed to be a lack of development of the anterior portion of the lower arch, with very thin covering of alveolar process over the incisor roots. Only one other case of death of the pulp in lower incisors was reported.

Inasmuch, then, as the upper central and lateral incisors are the teeth more often affected, so far as the death of the pulp is concerned, in orthodontia treatment, it will be interesting to hear the various causes assigned for such death.

### **Causes of Pulp Death During Treatment.**

Many believe that the upper incisors are more often out of alignment than any other teeth, and consequently a greater number of these teeth need orthodontic treatment; also that they respond readily to the forces applied in orthodontia. The thought is advanced that death of the pulp is most likely to occur when teeth are moved bodily, where the apex is driven through the process to a considerable extent, and that the upper incisors call for such treatment more frequently than other teeth. Others believe that rotating a tooth in its socket is more likely to cause strangulation of the pulp than any other movement, and that the upper incisors require rotating more than any

## ITEMS OF INTEREST

other teeth in the arch. All who expressed an opinion believe that risk is greater in rotating *when the root is fully formed*. In other words, the older the patient, the greater the risk. With one exception, it is believed that in all tooth-movement devitalization of pulp is most likely to occur only at or later than maturity, when the apical foramen has become constricted through completed calcification.

One prominent man, however, is of the opinion that death of the pulp is more likely to occur when the root is not fully formed. No reason was given. A report was received of three cases of death of the pulp in upper central incisors with the patients ranging in age from fourteen to sixteen years, though the movement was slight in every instance. In one of these cases a single thickness of tape carried between the teeth caused death of the pulp in one central. It would seem that there must have been some previous history of traumatism or accident to this tooth or else the general vitality of the patient must have been very low.

A few are of the opinion that the upper centrals are more apt to have the pulps affected because of their prominent location in the mouth, and while loosened up by the forces of orthodontia they frequently receive some traumatic injury which results in devitalization. The histories given for the death of the pulps of many upper central incisors tend to support this view.

An interesting case is reported by one man where one upper central was absolutely in its proper position, but the other upper anterior teeth required considerable moving. When the operation was nearly completed a pink discoloration was observed in the properly placed central, and on drilling into the tooth it was found that the root was not fully formed, though the age of the patient was such that under ordinary conditions the root would have been fully developed. Another somewhat similar case was reported by the same operator, and he has concluded that the teeth which are moved the least are the most likely to be affected, especially if they are used for anchorage purposes.

One man reports a case where the pulps in two upper central incisors died under quite rapid movement, and relates that the vitality of the patient was very low at the time. If I were to inject any of my own ideas into this paper at this time I would say that the vitality of the patient is an important factor to be considered in the death of the pulp from whatever source. My experience in trying to save the pulps of teeth when irritated from external influences led me to say in my book on "Practical Therapeutics," with reference to the treatment of exposed or nearly exposed pulps:

"Any attempt to permanently save an exposed pulp in the mouth



of a patient who is suffering from some systemic derangement interfering with the general circulation, thus lessening vital resistance, would doubtless result in failure; for in such cases the pulp would fail to receive from the blood supply the necessary elements for the restoration of its functional activity."

## Death of Pulps in Lateral Incisors.

The foregoing opinions have been largely those relating to the death of the pulp in the upper central incisors. We will now consider the opinions which deal with the upper lateral incisors. Several, in stating that these teeth were more likely to be affected, gave as their reason the fact that the lateral root is often curved, and in some cases, where malocclusion is developing, the end of this root frequently comes in contact with the advancing cuspid. One gentleman thought that the upper laterals were more liable to be affected when rotated, because the root-end is so often curved that when rotated the apex is moved more than with other teeth. One upper lateral was reported to have had the pulp die while being depressed in its socket. In support of the view that the upper lateral incisors were more likely to suffer, the reason given by one was their small size relative to the forces employed, and their frequent greater displacement, *i. e.*, greater in proportion to their size.

It would be interesting to know the number of the upper central and lateral incisors, the pulps of which have been reported to have died under orthodontic treatment, that had gold, artificial enamel or cement fillings inserted before the latter treatment was undertaken. Several mention the fact that some kind of filling was in the tooth before they began the orthodontic work. Others relate a previous history of accident. As many of you know, I have had a great deal of experience in bleaching teeth, and I have found more discolored upper lateral incisors due to death of the pulp than all other teeth combined. I have attributed this to the fact that the crown of this particular tooth is so small, that when a metal or artificial enamel filling is inserted, both materials readily transmitting thermal changes, it encroached so nearly upon the pulp that death of the organ frequently resulted. In my private practice and in my teaching at the college I advise the removal of the pulp in these teeth when the cavity is of any depth and the root is fully formed. This is to prevent subsequent death of the pulp and possible discoloration of the tooth-structure.

In one instance specific mention was made of the new ligature now being used by many orthodontists, which, by its rapid action and consequent change of the apex of the tooth, is a prolific source of dead pulps. What this new ligature is you doubtless know; I do not.

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### **Influence of Blood Supply.**

There seems to be a prevailing opinion among some orthodontists to the effect that the anterior teeth, both upper and lower, receive their blood supply from smaller blood-vessels, for the reason that they are situated in the arch farther from the source of supply; and therefore, when these teeth are moved, the pulps are more likely to be affected. On this point in particular I wrote to one of our foremost histologists, Dr. Broomell, of Philadelphia. He says: "My actual experience in orthodontia has been quite limited, including, generally, cases of a simple nature. My reply to your questions will, therefore, be a general one, based chiefly upon what I think takes place, this belief being acquired from my work along the line of histology and development of the parts involved. I believe I am already on record in the proceedings of the American Society of Orthodontists as favoring the idea that the movement of young teeth, as generally practiced in orthodontia, would not endanger their vitality. I believe this to be especially true before the roots of the teeth are fully calcified, during which time I am convinced that no vessels, other than those contained within the dental follicle, or its remains, the forming peridental membrane, enter the wide-open root apices.

"In the rotating or lateral movement of such teeth the root and follicle are necessarily acted upon at the same time, and there can, therefore, be no marked strangulation of the blood-vessels in and about the tooth. In older teeth—those with their roots fully formed—the conditions are different, but even here I doubt very much if the death of the pulp ever follows careful orthodontic procedure. I believe that the lateral movement of a tooth would be more likely to interfere with its vitality than rotation, but I cannot see that the anterior or simple teeth might be more easily devitalized on account of the size of their blood-vessels, because these are practically of the same calibre as those going to the individual roots of the complex teeth."

The reply from Dr. Frederick B. Noyes, of Chicago, came late and was, therefore, not incorporated in my original copy which was sent to the discussers. It follows:

"In reply to your questions in regard to the 'Death of Pulp in Orthodontia,' it is certain that there has been more or less trouble from the death of pulps in the moving of teeth.

"In my own experience I have never had a pulp die during or as the result of tooth-movement, but I have seen several cases in mouths treated by others, and am therefore not in a position to answer the third, fourth, fifth and sixth questions. I have thought a good deal about the causes of the death of pulps, and from the study of the structure of the tissues

and the nature of the blood supply it has seemed to me that death of the pulp, at least in young persons, must be due to the cutting off of the blood supply. This I believe to be possible in two ways: first, by purely mechanical conditions, the blood vessels which enter the pulp being squeezed between the root and the bone or between stretched bundles of fibers. Second. By the production of inflammation which would result in stasis in the apical space. Both of these conditions must be considered as the result of the use of improper and excessive force. The former is much more likely to occur by the use of excessive force in the early stages of movement. The latter, by the improper use of force in the later stages. If the tooth is not held firmly, but is allowed to recoil, as from an elastic ligature, under the pressure of the lips or tongue, or in the use of the teeth, the blood vessels will be sawed between stretched bundles of fibers with every movement. The result of this sawing on the wall of the blood vessels is to excite an acute inflammation, which may result in stasis and consequent death of the pulp. It is possible that the central and lateral incisors, because of their positions, may be more liable to these conditions, but I know of nothing in regard to their blood supply that would put them in a class by themselves. I believe that death of pulps in orthodontia movements should be very rare."

The opinions of Dr. C. S. Case and Dr. E. H. Angle, which accompanied their brief answers to the list of questions, in view of their extended experience, cannot but be of value to all who are interested in orthodontia.

**Opinion  
of Dr. Case.**

Dr. Case says: "The above questions are too inadequate to tell the whole story relative to the influence which orthodontia operations exert in causing the devitalization of pulps. In the first place,

orthodontia as it is practiced to-day has a very wide range of character in relation to this subject. Toward the extreme on the one hand, it is a wonder that the life of far more pulps are not destroyed, and, on the other extreme, the vitality of healthy pulps should never be considered endangered through a skillful movement of the teeth.

"This difference depends partly upon the methods employed, but mostly upon the operator, because however scientifically constructed are the appliances, an inexperienced or careless operator may easily endanger the vitality of the teeth to which they are attached by forcing movements of the teeth more rapidly than it is possible for physiological action to take place. The greatest safety lies with teeth that are held firmly in the grasp of a regulating machine that permits no back and forth movement, and with which they are steadily but slowly moved to place. Hundreds of cases are on record of the bodily movement of teeth,

a distance from one-half to the full width of a tooth, for patients from twelve to twenty-five years of age, and which left the teeth and surrounding tissues in a perfectly healthy condition.

"A 'bodily' movement (which means that the apical ends of the roots are moved with the crowns) would probably have a greater tendency to destroy the pulps of the teeth than other movements having the same display of special requirements and skill. By this I do not wish to infer that pulps have not died in my practice during movements of the teeth with no apparent reason for it, though I have always believed that it might have been avoided if anticipated, with a more perfect fulfilment of the higher physiological demands of orthopedic movement. In several instances, where dentists in distant towns have been employed to carry forward my cases, pulps have been destroyed purely through an unreasonable rapidity of movement.

"In the majority of cases in which pulps have died in my practice the cause has been traced to blows or some form of traumatic injury. Protruding front teeth, because of their prominence, are more subject to injury than other teeth.

"In a number of instances devitalized pulps, caused from injuries, have occurred before they were presented for orthodontic treatment, and in some of these the patients were surprised to learn that the pulps were dead, the slight discoloration and pain not indicating a serious condition. All of these patients, however, when attention was called to it, could remember the particular time when they received the injury, followed by pain and soreness of the teeth that caused the trouble. I speak of this because had I started the operation without discovering the condition it might have been attributed to the operation, even by myself. So frequently has this arisen that I now consider it imperative to carefully examine the teeth for devitalized pulps in all preliminary diagnoses."

**Opinion of  
Dr. Angle.**

Dr. Angle writes as follows: "Formerly it was not a very uncommon occurrence to have the pulps of teeth die during orthodontic work, but I am now positive that it was not due primarily to the movement of the teeth, but to inflammation due to the improper application of force in tooth-movement, or, more accurately speaking, to the too frequent relinquishment and reapplication of forces, thus allowing the springing backward and forward of the tooth in its socket, with the resultant severe strain on the circulation. And this is almost the only cause of soreness and inflammation in moving teeth. In driving bands to place, of course the smaller the root of the tooth, the more subject to injury from the sudden application and relinquishment of pressure. More

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teeth die as a result of rotation, and the more difficult the tooth is to rotate, naturally the greater the liability of the death of its pulp, from the frequent relinquishment and reapplication of pressure throughout the prolonged operation. Strictly speaking, I do not think it can be said that any one of the seven tooth-movements, as a movement, is more disastrous than any other. Naturally, I would say that liability to accidental death of tooth pulps would increase with the age of the patient.

"And finally, the death of pulps in orthodontic treatment is no longer excusable, and when it occurs it is the best evidence of ignorance or carelessness or both. Dead pulps are the relics of crude methods in orthodontia and are, in reality, a dead issue with truly up-to-date orthodontists, for teeth should be moved so gently and continuously as to avoid soreness and inflammation, and if soreness and inflammation do not occur there can be no death of pulps in tooth-movement. I do not think that even in the extreme cases of teeth with very crooked roots there would be even probability of the death of the pulp if the movement be conducted in a physiological manner.

"These are my candid views after much experience, close observation and long reflection, and I am very happy to tell you that I have just completed some experiments and methods which will enable us in the future to reduce the possibilities of irritation to the periodontal membrane to the minimum. And although that might be said of the present methods, if intelligently comprehended, yet the new plan makes it almost impossible to so crudely apply force as to cause inflammation in tooth-movement."

In brief summary of the data obtained from these many sources I will say that the first, second, third, fourth and sixth questions are personal ones, while the fifth, seventh and eighth call for the expression of an opinion based upon personal experience.

### Deductions.

The general answer to the fifth question, viz.: "Do you believe that any particular tooth is more likely to suffer in this way than any other teeth in the arch?" is in the affirmative, and the teeth named are upper central and lateral incisors. The reasons given are:

1. More frequent displacement than other teeth.
2. More readily moved when a given force is applied.
3. More apt to be injured by accident on account of their prominent location.
4. Curved roots of the laterals.

The general answer to the seventh question, viz.: "What form of movement is most likely to result in pulp devitalization?" can be given

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as follows: Any movement which involves the apex of the tooth, especially when the root is fully developed; as, for instance, when the tooth is moved bodily in any direction, or depressing, elongating or rotating a tooth in its socket.

The general answer to the eighth question, viz.: "At what age is devitalization most likely to occur?" is well stated by Dr. Guilford when he says: "Only at or later than maturity, when the apical foramen has become constricted through completed calcification."

In this paper thus far I have simply acted as the mouthpiece of others, and while it is a pleasure to do so on this occasion, and the position is one which affords many advantages, I, nevertheless, find it unnatural, for it is not in keeping with my previous training. Therefore, at the expense of being criticized, I will propound the ninth question myself, and straightway proceed to answer it in my own way, viz.:

Ninth. When devitalization of the pulp does occur in orthodontic work how should the tooth be treated so that permanent discoloration will not result?

### **Treatment in Cases of Pulp Death.**

There is nothing more unsightly to a conscientious dentist or to an appreciative patient than a discolored tooth in that patient's mouth. And inasmuch as I am not an orthodontist myself, I can say that I know of no class of men who are more thoroughly in earnest and more conscientious in their work than those who are engaged in your specialty; and surely any patient who will take the time and go to the expense of having orthodontic work done must be appreciative. The usual sequelæ of accidental death of the pulp, though it need not be so to-day, is a permanent discoloration of the tooth-structure, and since we have found that the upper anterior teeth are most likely to suffer in this respect, the answer to the question which I have asked must necessarily interest you whether or not you personally do this work. There are two ways by which discoloration of the tooth-structure is produced when the pulps of the teeth are affected, as in orthodontic work. First, we have that pink discoloration referred to by many in their replies to the questions as the first indication that the pulp was affected. This is frequently, though not always, produced when the pulp is strangulated. Applications of certain drugs, notably arsenic trioxid, to the dentin or to an exposed pulp have been known to produce this characteristic color. How this discoloration is brought about is explained nicely by Dr. Kirk in the "American System of Operative Dentistry." He says: "It is now known that the pink staining of the tooth is brought about by a rupture of the stroma of the red blood disks liberating their contained hemoglobin, which readily penetrates the tubuli,

the lumen of which is insufficient to admit the unbroken red corpuscle. This pink discoloration, resulting from the infiltration of hemoglobin solution, represents the first stage of tooth discoloration. The pink stain readily undergoes alterations, later on assuming a brownish tint, due to the breaking down of the highly complex molecule of hemoglobin into a reduction product known as hematin."

When this pink discoloration is observed the sooner the pulp is removed the better, for after the hematin is formed, causing a brownish discoloration, it is more difficult to permanently bleach the tooth. In removing the pulp and in the subsequent treatment, including the filling of the root, great care should be exercised in the selection of drugs used so as not to further discolor the tooth. If the pulp is removed as soon as this characteristic color is noticeable, before the stain has had a tendency to dry in the tooth, the normal color can be nearly restored by washing the dentin with warm sterile water to which about one or two per cent. of sodium chlorid has been added. After the tooth is treated and the root is filled, one or two applications of an ethereal solution of hydrogen dioxid will generally restore the tooth to its normal color, when the lingual cavity should be filled with a quick setting, light colored cement and a permanent filling inserted. Sometimes it is necessary to seal the solution of hydrogen dioxid in the tooth before satisfactory results are obtained.

The second way by which the discoloration of the tooth-structure is produced is when the pulp dies and decomposes, with frequently the ultimate formation of an abscess. Here the discoloration too often results from ignorance or carelessness on the part of the dentist in treating the condition, for in many cases the pulp has died and an abscess formed with the tooth still retaining practically its normal color.

The mistake which is often made here is to drill into the tooth and leave the cavity open, with the end in view of affording drainage. This is a positive means of producing discoloration, for air and saliva, especially the former, will so change the iron compounds which result from pulp discoloration as to produce certain characteristic colors in the tooth-structure. The chemistry involved in this process I have explained in other articles and need not be here repeated. It is essential to remember, however, that to avoid discoloration in treating the putrescent canal or the abscess, the cavity in the tooth should always be hermetically sealed when the patient is dismissed. With the remedies we now have at hand this is always possible. I know that it is the general practice in treating such teeth to leave the cavity practically open for the first or second treatment. I know, too, that many teeth have been needlessly, and, some of them, hopelessly discolored by such treatment. When cases of

this kind are presented for bleaching, the operator must be governed largely by the case at hand. No universal method can be given for bleaching teeth that have been discolored by careless methods of treatment.

Now, since I have imposed upon you to the extent of injecting some of my individual thought into this paper, I will conclude with the hope that the discussion, if not the paper, will be of interest and value to the society.

### Discussion of Dr. Buckley's Paper.

Mr. President: It is needless to say that I have enjoyed this paper, because it is a subject which I have particularly wanted to see discussed in our literature for many years, and I think this is the first serious and logical discussion that has been given to it. I also thank Dr. Buckley for bringing in question nine, which I think is quite important.

There have been a number of causes assigned to the possible death of the pulp during tooth-movement, and it seems to me we may divide the causes now into two classes: first, those directly connected with the work, and, second, those of an extraneous character. For example, we may have unnecessary stress put on a tooth by the orthodontist not properly making application of ligatures. Again, we might have the same result from the same degree of stress reaching a tooth accidentally, and not through the fault of the orthodontist. That makes the two classes, and they are both, in a sense, traumatism.

I quite agree with Dr. Angle when he states that a tooth is practically safe in any of the tooth-movements, provided the movement is made slowly, and it would seem that the gentleman who reported the death of a cuspid pulp had broken this rule when moving the cuspid  $1\frac{1}{4}$  inches in five months. That is too much movement for the length of time. That is a legitimate instance of improper stress placed on the tooth by the orthodontist. I would like to discuss traumatism now from another standpoint.

#### Traumatism During Tooth Movement.

Traumatism which may reach a tooth is of two-fold character: one from serious stress which may come to the tooth during movement is of the following nature: The orthodontist may have to deal with a patient who seriously objects to having any work done, and who devotes much time to removing his ligatures, and



if he should succeed in putting on one ligature which resists this attempt, and the patient should remove every other ligature, there would be an immoderate stress on the tooth, which might, in twenty-four hours, elevate a tooth in its socket to a dangerous extent. This is one of the most serious problems I have had in the past year. I have had four patients who have persistently removed ligatures. I dismissed one, a boy, from my practice on this account. The others are girls and I have continued with the cases, but I have certainly suffered many nights of anguish because these children come in with appliances attached to one or two teeth instead of to several.

**Case from  
Practice.**

An interesting case is the following: I have been treating a Class III. case for a number of years—from childhood up—and I had a very rigid appliance, practically a Case contouring appliance, on the upper arch: the double bow for moving the teeth bodily. All the teeth in that arch, as well as in the lower arch, were practically bound together with bands on each tooth, and we used intermaxillary force to shift the bite. The child is docile, and reports all difficulties, and that makes the responsibility all the greater. If the patient obeys orders the result is on your shoulders, be it good or bad. This child called me on the telephone one day and reported that a central incisor was sore. I instructed her to abandon the intermaxillary ligatures until her next regular visit. On the second day she reported that it was still sore, and I had her come to the office. To find that front tooth positively sore and tender to the touch and yet tightly bound to all its neighbors surprised me very much. I left the ligatures off until the soreness died away. As soon as we renewed the intermaxillary force the soreness returned. Perhaps I was slow in making a diagnosis, but this eventually proved to be the truth: in shifting the bite there was produced an end-to-end occlusion which caused the greatest amount of masticatory stress to be on that one tooth. It was an atom longer than its neighbor and it received the full force of the stress. Instead of relaxing the force, as previously, I redoubled it, and as quickly as possible got the tooth over the bite, after which the disturbance ceased. We must watch, therefore, for the undue stress of mastication while the teeth are loose in their sockets.

Another kind of traumatism is where the patient receives an actual blow on the tooth from outside sources. There is no doubt that the fact that central incisors are reported to be the greatest sufferers is largely due to this. Outside of orthodontic practice, they are the ones which suffer the most; they are most frequently broken: the child is most

likely to strike the centrals when he does fall. I remember a case in my practice long before we were undertaking early treatment where a child was brought to me with her two upper incisors very prominent, and the parent wanted to know if the case could not be left until later for treatment. I said, "Yes, but I am afraid she will fall down and break the central incisors," and so I began treating the case solely for that purpose, and moved the incisors lingually. A year afterward she fell down and broke one off anyway. But I felt I had gained something, because only a very small piece was broken off, whereas she might ordinarily have broken off one-half of the tooth. The prominence of the centrals in the arch renders them more liable to receive a blow, and the fact that they are loosened in their sockets makes them more liable to suffer from the blow. The one instance of this kind in my practice is where a girl's brother struck her on the mouth with a toy trumpet. The pulp died, although it was not a heavy blow; this pulp was promptly removed, bleaching agents used, and discoloration prevented.

**Rotation.** In regard to rotation, I think the gentlemen who have expressed an opinion that the pulp might die by rotation of the tooth are centering their eyes on the wrong end of the tooth. If you will stop to think how short a distance you move a tooth when you rotate it, looking at it from the incisal end, and then remember that it is practically a cone, and consider the extent of actual movement at the apex of the tooth, you must admit that it is measured in parts of millimeters.

So far as lateral incisors with curved roots are concerned, that manifestly cannot occur in the practice of to-day as much as formerly, because we move them before the root-ends are formed.

A gentleman once told me that he had rotated a badly turned central incisor a complete circle, and I asked him why he did not leave it where it was?

Of course, if the rotation of teeth be so rapid as to create a pericemental disturbance you might get an inflammatory condition and strangulation, which did not depend so much on the distance moved as upon the irritation set up.

I cannot accept the proposition of the gentleman who supposed that a pulp died simply from putting a piece of tape between the teeth. That death must have been due to something else. Neither can I believe that teeth used as anchor teeth, but not moved, can suffer. If they suffer they must have been moved, I think. Every expression of force is in two directions, and we often think we are using a tooth as stationary anchorage when we are not.

## ORTHODONTIA

### **Treatment After Death of Pulp.**

The advice to remove these pulps as quickly as possible brings to my mind a sad case. A patient of a confrere in another city, passing through New York, called on me with a note from her orthodontist, saying that if, in my judgment, the retainers should be removed, he was willing that I should remove them, and he described the condition as it had originally existed. Retainers had been on for two years and I removed them. I at once noted what seemed to me a slight discoloration of one of the incisors. It seemed slightly darker than the other. It was not my patient, however. If it had been my patient I should have promptly drilled into that tooth, so certain was I that the pulp was dead or dying. The patient, however, would in two weeks return to the city of the orthodontist who had treated the case. I advised her to immediately call on him. The disturbance progressed very rapidly, and actually while on the train to that city an abscess developed, the lip became swollen, and she was in great distress when she reached her home town. She was immediately sent to a very skillful dentist, and every precaution was taken to restore the color of that tooth, but without success. A beautiful girl was disfigured for life because I did not follow my own best judgment and drill into the tooth promptly. It has been my experience that when pulps are taken out immediately a very good result can be had as to color.

My treatment is to remove the pulp as quickly as possible. They are usually unresponsive to pain. Allow all the hemorrhage to cease. Wash out canals with a warm saline solution and then use a 25 per cent. pyrozone and seal it in for twenty-four hours, and prepare for a whole morning session on the second day. At that session I fill the canal and proceed with further bleaching, preparing the outer cavity for a porcelain inlay. With rubber dam in position the tooth is bleached one, two or three times, as necessary, and the upper two-thirds of the cavity is filled with oxy-chloride of zinc and the porcelain inlay is also placed in position at the same sitting. One case so treated seven years ago is still exhibiting good color, so good that it is scarcely a shade darker than the other teeth.

I want to thank Dr. Buckley personally and on behalf of the Society for bringing us the views of Doctors Case, Noyes, Angle and Broomell, as well as his own views on this important subject.

Realizing as I do the importance of this subject  
**Dr. Carl Case.** and the interest it has for the orthodontist, I shall not waste time in expressing regret that I am unable to attend this meeting or pleasure that the opportunity has been afforded

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me to read Dr. Buckley's most excellent paper and to be heard in the discussion.

There are many facts that have been well brought out in the paper which seem to be generally recognized by us all and which have been emphasized by both Dr. Calvin Case and Dr. Angle, with whom I most heartily concur with one or two exceptions.

Beyond these facts, however, I do not believe that the evidence submitted can be regarded as conclusive.

There is good ground for believing that the upper incisors are more subject to pulp deaths than other teeth. Their prominent position lays them open to injury. They are the teeth which are probably most easily loosened in their sockets and moved, and they are the ones which usually undergo the greatest movement. The data gathered concerning the number of deaths occurring among these teeth prove the truth of the belief, and in my opinion answer conclusively the second, fourth and fifth questions.

The fourth question, however, might have been given greater scope and made to include the history of traumatism *before* regulating was commenced.

I believe that this must be considered as a predisposing cause, as the vitality of the pulp would undoubtedly be considerably lessened, which would naturally make it more subject to the inflammatory processes usually attendant on orthodontic operations in a greater or lesser degree. And the same might be said of all teeth which contain cavities or fillings, as Dr. Buckley has stated.

Concerning the third and seventh questions, I do not believe that one movement more than another is likely to cause the devitalization of the pulp, *provided the force applied and the movement secured is consistent* with the physiological change in structure which always takes place in the surrounding tissues. This naturally refers to good, sound teeth and not to those which have sustained traumatic injury or which contain cavities. The pulps of such teeth, as has been stated, are not in a normal condition and are more ready to respond to irritation.

The evidence of the operator who had the pulp die in a tooth which was not moved while the position of all the others was being changed, or of the man who caused the death of a central incisor by inserting tape, can be considered only in the light of an unfortunate personal experience, and, as Dr. Buckley says, the death in these cases, were the full history known, could probably be attributed to some previous injury. But certain it is that a belief that the teeth which are moved the least are the most subject to disastrous results is too inconsistent to be even considered.

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The seventh question has been answered in various ways, and the reasons given are logical and well-founded, though the data furnished is insufficient to support the various beliefs as to which movement is likely to cause the most harm.

Dr. Angle thinks that a rotary movement is responsible for more deaths than any other. Very possibly this is true. But when it is remembered that rotation is one of the most common movements practiced I doubt if the proportion of deaths due to such movement, as compared with the total number of teeth so regulated, would be any greater than the deaths due to other regulative movements.

Dr. Calvin Case believes that bodily movement as a movement would have the greatest tendency of all to cause devitalization, and his belief is well founded, but I can say positively from my own observation of the numerous cases in which bodily movement has been applied that his belief is not substantiated in his own practice.

In the hands of another man, however, who was not so skilled nor so well posted in the possibilities of movement or the necessity of applying force judiciously and with great care, a different verdict would undoubtedly be given.

If such statements can be applied as evidence, then, in my opinion, it is proved that no one movement is more disastrous than another if, as Dr. Angle says, force is applied in such a consistent manner that soreness and inflammation are avoided.

Summing up, then, all the evidence that has been produced, we find that:

First. Upper incisors are the teeth which are most often affected, all others to be almost eliminated from consideration.

Second. That in a large majority of cases there was a history of traumatism.

Third. That in a number of instances there were fillings or cavities in the afflicted teeth.

Fourth. That invariably, in all instances where the appliance itself has caused no undue irritation and where the applied force has been gentle, consistent, judicious, and in keeping with the physiological change in the surrounding structures, the death of pulp must be attributed to some cause beyond the control of the operator, and I believe that in speaking thus I am voicing the sentiments of the entire Society.

I would like to ask a question, and also state  
**Dr. Morehouse.** some of my views regarding this matter, especially with reference to the elongation of the upper central incisors, we may say, at an age before the apical ends of the

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roots are fully developed. Is there not more danger in the elongation of these teeth at that time than at a later period, when the root has completed its full development? I have hesitated many times in the elongation of these incisors, because I have felt there might be a tendency to cause the death of the pulps of those teeth. So I have hesitated, and in most instances I have not attempted to bring about this elongation. I would like to have this matter made as clear as possible, either by Dr. Buckley or others, because it has been a continual worry, and it is an undecided point in my mind as to the best procedure in treating teeth under such circumstances.

I first wish to thank Dr. Buckley for his paper, **Dr. J. Lowe Young.** and particularly for that ninth question and his answer. I really think the paper would be very incomplete without that, and I am sure we all appreciate very much that Dr. Buckley inserted it. It was not intended when that letter was sent out by the secretary that Dr. Buckley should confine himself wholly to the original questions at all. He was at liberty to make any additions he desired.

The question of rotation of teeth has received some discussion, and I was much pleased with what Dr. Buckley said about the early intervention in this part of our work. The whole trend, it seems to me, of orthodontic interference is to treat cases as early as possible. I have for some time been rotating bicuspid just as soon as the two cusps are through the gum. It is not a very easy matter to fit a band on the bicuspid under such conditions, but I have accomplished it by making a number of sizes of plain bands and having them in stock, varying in size .02 of an inch in circumference. I take, say, No. 90, which is .90 of an inch in circumference, and try it on the cuspid. If too small, I take a size larger, and if too large, a size smaller, and in that way I can band those teeth when they are just emerging through the gum, and I find that a very few weeks of gentle force causes the tooth to rotate without any trouble at all, and I have also found that two or three month's retention of teeth so rotated is all that is necessary. Two or three years' retention of rotated teeth is not always sufficient when rotation is begun after root and bone are fully developed, so I believe in the early rotation of teeth.

As to the question of the death of the pulp during this rotating movement, I think that might be more likely to follow where the force is improperly applied. I mean by that, that the spur was so soldered on the band that when the ligature from the spur passed around the arch, it tended to depress the tooth, in its socket, rather than elevate it in its socket. If it tends to depress the tooth in the socket it makes it

more difficult to rotate and so takes longer, and you may strangle the blood vessels. If the tendency is to pull it out of the socket it will rotate in a short time without danger of death of the pulp.

As to the question of Dr. Morehouse, which I will answer in my way and let Dr. Buckley answer as he sees fit, it is questionable in my mind if it is necessary to elongate upper incisor teeth prior to the full formation of the root, because during the formation of the root the tooth is erupting and would tend to come down of itself. I suppose there may be rare instances where it is necessary to do it, and if done very gently I should have no fear of elongation even at that time.

I will also make my thanks and follow Dr.

**Dr. Bogue.** Young's example in taking up question nine. I may be permitted to digress a second to say that brings us to the point as to whether such men as I should be allowed in this Society or not! Dr. Ottolengui almost comes under the same category when he so splendidly states what he would do in a given case where he found a tooth becoming discolored through manifest death of the pulp. He does something else besides orthodontia, but follows the dictates of his own conscience. I could not avoid announcing in my letter to Dr. Buckley that I knew of but four cases of death of the pulp. One patient lost the left central and lateral (upper). I never knew from what cause, but I fancy from the use of rubber bands. The patient was a child fourteen or fifteen years of age and almost a dwarf. This was fifteen or eighteen years ago, I cannot tell which, and the teeth were treated as soon as discoloration was noticed and remain now in fairly good condition, so far as color is concerned. The next case was more than thirty years ago, and the death of the pulp was not noticed for several years after the orthodontic work had been done. I never knew whether it was orthodontia that destroyed the pulp or not. That case, too, had a rubber ring on the left upper central incisor.

The fourth case had the symptoms which Dr. Ottolengui so carefully described, and the child was so good that she hesitated to let me know she was being hurt. The incisors and cuspids and the teeth that were being formed at the same time they were (two or three years of age) have never been covered with enamel, and the right central, when she came to me, had the pulp nearly or quite exposed and that died. Orthodontic work had nothing whatever to do with it, I am sure.

I have written among my notes, as Dr. Buckley went on, that rapid movement in the alveolus is not admissible, and yet you find the patient asking, "How long is this to take? When will you finish?" He who can resist such pressure without offending the patients and turning them

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away is, perhaps, rather adroit, and is, perhaps, able to do what some cannot do. While this rapid movement in the alveolus is not admissible except when the whole surrounding alveolus is bent or moved, that means we are carefully to consider a great many of the points which a few years ago were either not thought of at all or were passed over.

Dr. Broomell's statement, I think, merits very careful attention. He must have written that with a great deal of care, and Dr. Noyes's letter might be put down in one single word—he thinks the choking responsible—and there again we come to the fact that most of our movement is made long before the roots are formed, and ought to be, if we can possibly bring it to pass.

Dr. Case states his case so inaccurately that he does not convey much information. He thinks that rapidity of movement is the cause of death of the pulp. I think Dr. Case is teaching what is not in accordance with nature when he bands a half dozen teeth, or, in two instances, where thirty-two teeth were all fastened together. That is not in accord with nature, and that pulps will be destroyed under those circumstances is not surprising. Dr. Angle states his case splendidly with reference to the intermittent pressure, etc., yet we often see in our literature the recommendation to remove fixtures once in so often for prophylactic purposes.

I understood the President to say that he did not wish discolored teeth to come into this discussion. But I will say that many years ago the application of chlorin was advocated for a bleaching agent for inorganic substances, and iron, which is the base of the coloring matter of the blood, is not an organic substance, but is inorganic. Therefore, chlorin is entirely inadmissible, even if Dr. Kirk does use it. Oxalic acid is the proper thing, and then the pyrozone, as has been advised. Chlorin causes the tooth to become yellow and also attacks the animal matter that remains there, and thus makes the tooth brittle.

I wish to offer Dr. Ottolengui my thanks for bringing out as carefully as he did, in connection with this discussion, the behavior of unwilling patients. I am very grateful to him for bringing the subject up as he has, and the suggestion that those who will persistently tear off their fixtures might better be dismissed from our practice is a pretty good idea. Again, Dr. Ottolengui has shown unusual care, as I noted with interest, on the occasion which he reports where he redoubled his pressure and shifted the bite positively and quickly.

There is one matter I would like to have come in this discussion, and which I have asked Dr. Buckley to discuss in closing, but I will explain myself a bit. I have been impressed by the want of some accurate and



certain method of diagnosing the incipient death of the pulp, and I am in that quandary now. I have consulted, in two or three instances, with general practitioners, with uncertain results, and I would like to have some positive method of diagnosing the commencing of death of the pulp. In many instances there is a slightly blue shadow cast on the teeth by platinum bands. In one case I was so certain the pulp was beginning to die that I was on the point of drilling into the tooth. It did not respond to heat and cold as quickly as it should. I sent the case to a general practitioner, and he made some tests with uncertain results. We had a radiograph taken. There was no evidence of congestion of the pulp, and the case has now gone for two years with every evidence that the pulp is alive. I wish we had some absolutely certain method of diagnosis. I am told the Faradic current may be successfully used in this connection: that it is absolutely certain and quickly used, and, if so, it is just exactly what I want.

I would like to add to Dr. Hawley's question.

**Dr. A. B. Ketcham.** We know that sometimes the pulp is congested, the tooth sensitive to heat and cold, and it is possible there may be a very slight change in the color of the tooth, yet if we remove the pressure the soreness disappears and the tooth sometimes resumes its normal tone. Is it possible that the pulp resumes its normal condition, or is it probable that the pulp dies without pericementitis resulting at once?

I would like to follow the same question by asking Dr. Buckley his experience in reference to restoration of a slight discoloration? Also, the matter of giving the tooth rest, I think is important, and having the patient call at the office daily for two weeks and have the assistant run the rubber cup over the surface of the tooth to increase its temperature: a massage for thermal stimulation. That has been satisfactory in two cases in my practice. A slight yellowing of the central superior incisors was overcome by that method. I would like to know if Dr. Buckley has had any experience of that sort.

Does Dr. Buckley believe that a floating thrombus has a tendency to destroy the pulp of the teeth?

**Dr. M. N. Federspiel.** In an operation for a cystoma the dentist reported that two lower bicusps and the lower first molar had become devitalized. According to my thought, possibly an embolus had formed, which probably disturbed the circulation, causing extravasation necrosis. Slow methods of moving teeth will not cause devitalization of the pulp.

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What is the difference between a machine and a regulating appliance? (State Board question.) I think a six-cylinder machine will destroy any tooth pulp.

Mr. Chairman and Gentlemen: I feel that the  
**Dr. Buckley.** granting permission to have this paper further discussed, by throwing it open for general discussion, has been out of courtesy to the essayist, as I am not a member of the Society. You would not have hurt my feelings by confining the discussion to the two members appointed for this purpose. Dr. Ottolengui's discussion, as usual, was so logical that I can say nothing except that I would hesitate to seal a 25 per cent. pyrozone solution in a tooth before the root is filled, and how he can do it without subsequent trouble I cannot understand. Pyrozone will cauterize the cuticle of the finger, and I would not take any chance of cauterizing the tissue of the apical area.

Regarding Dr. Morehouse's question, the instances are rare where it is necessary to elongate teeth, but in case of such a necessity I would not hesitate to do so, because of any liability to cause death of the pulp, provided the usual precautions had been taken by the orthodontist. If I had time, and if it were of interest to you (as it would not be), I would disagree with Dr. Bogue in regard to chlorin. I would not use it for bleaching teeth, but my reason for not doing so would be different from his reason. It decomposes water and we get oxygen, and the oxygen does the bleaching. We have an acid formed, and that is the objection I would have to the use of chlorin for bleaching teeth.

The main objection as raised by Dr. Hawley is the pathology associated with diseases of the pulp. How can you tell when you have overstepped the borders of physiology and entered the field of pathology? There are three diseases of the pulp with which orthodontists should be familiar, and the symptoms of which they should understand. They are active hyperæmia, passive hyperæmia, and the third, true inflammation. In active hyperæmia the pain is produced by the application of the known irritant, and when removed the pain subsides at once without treatment. Here we have the interference only with the arteries and not the veins in the pulp, and I doubt if the slight pinkish discoloration can take place in this disease. One or two intimated that they have had a slight discoloration, which cleared up after removing the appliances, etc. I do not think, if we have this pink discoloration, that the tooth would ever revert back to normal. In passive hyperæmia we have a clogging up of the veins of the pulp, and in that clogging system you have certain blood elements escaping, and this being coagulable, that pulp will ultimately die, and if you have the other disease, true inflammation, with the

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characteristic diapedesis of the red blood discs and coagulable material of the blood, then of course, too, the pulp must die. I am not advertising, but I have a paper before the National Dental Association on the importance of diagnosing properly. I would be pleased to see you in the audience when I read my paper next week.

Just one minute to defend myself. If I left the  
**Dr. Ottolengui.** impression that I have ever sealed 25 per cent. pyrozone in an open canal, it was due to the fact I was speaking extemporaneously. I have never done this. I do not fill the root, because you should have as extensive action of the pyrozone as possible. The extreme apex is closed before the pyrozone is used.

I would like to ask Dr. Buckley if he would not  
**Dr. J. Lowe Young.** give this Society his ideas of definite diagnosis of death of the pulp, so it might be printed with our proceedings, because I think we men interested in orthodontia are less liable to read the proceedings of the National Dental Association than the proceedings of this Society. We would appreciate it very much if he would give us that now.

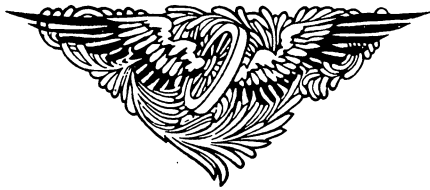
**Dr. Buckley.** Mr. Chairman and Dr. Young: Do you want me to give the symptoms?

**Dr. J. Lowe Young.** How shall we diagnose whether the pulp is dying or not?

I have briefly gone over that. The only way  
**Dr. Buckley.** to make a diagnosis is by asking the patient questions and by observing the conditions. I think if you have discoloration of the tooth you have overstepped the bounds of physiology, and you have either passive hyperæmia or true inflammation. If the tooth is merely sore and the patient experiences pain, which pain is controlled by relieving pressure, or by the conditions as they are allowed to subside in a few hours, and if pain is not continuous, there is no serious disturbance of the pulp. The pulp responds to the slightest irritation; it has a marked recuperative power, however. No tissue which I know of has the ability to readjust itself more readily than the pulp tissue. If it passes the stage of active hyperæmia and if the pain is continuous and needs treatment—or even if it be intermittent—then since we have passive hyperæmia the chances are very great that the pulp will die ultimately, even though you stop your procedure at once, and in true inflammation you would be apt to have the marked discoloration, because the chances are you have the rupture of the blood-cell disc liberating the hemoglobin, and you have the pink discoloration as the

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hemoglobin dissolves and infiltrates the dentin. It is the pain that is the indicator, and orthodontists keep within physiological limits usually. If by accidents of some kind that point is overstepped, you there enter the field of pathology, and it is not any fault of yours, and I do not know how you can help it. If you pass the stage of active hyperæmia the pulp ultimately will die, unless it is possible the pulp may recuperate, but that is doubtful at least. It is best to remove the pulp as quickly as possible or have it removed when the reading of the symptoms indicates ultimate death. I do not know enough of the Faradic current in the diagnosis of diseases of the pulp to speak of that.



# SOCIETY PAPERS



## Sugar the Cause of Tooth Decay.

By Dr. R. ROESSLER.

*Read before the New Jersey State Dental Society, at Asbury Park, July, 1910.*

It is a well-known fact that, in all historical and prehistorical events, it is impossible to find an immediate or direct cause, but that there are a succession of underlying causes which contribute toward the final result.

### Early Uses of Sugar.

With the growth of civilization there has been developed a variety of tastes and inclinations, and it remains to be proven that any of the early races ever used sugar as a general nourishment, or even as an ingredient in their food. Theoprast, who, about the year 350 B.C., wrote a book on plants, states distinctly that sugar was only used for medicinal purposes. Sugar is not mentioned in the teachings on diet of the Greek athletes, nor by the Spartans, although the Greeks knew of sugar. Diaskorides, a Greek physician, living A.D. 50, mentioned sugar as a medicine in his *Materia Medica*. In the ninth century Arabic physicians used sugar (Arabic, *sukhar*) as medicine.

In search for more traces of sugar we find that it was used as a remedy in the year 327 B.C. in Bengal, East India; in 250 B.C. in China. In the Middle Ages crystal sugar was scarcely known, and honey was used as a substitute for sugar, more or less for curative purposes. It is therefore clear that a former medical remedy has been, within a century, adopted as a food and has become a great factor in the mal-nutrition of the people.

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Hand in hand with the modern methods of manufacturing sugar, which have developed since the beginning of the nineteenth century, the progress of medical science has advanced. New diseases compelled medical science to look for new remedies; in the meantime the old remedy, sugar, on account of its taste, has captured the market and coined millions for the manufacturers.

Medical science at first denied any injurious effects from the constant use of sugar; some of the so-called corypheas even went so far as to declare that sugar is a concentrated food, and only the good old "Public Opinion" advised against the consumption of sugar.

The more we investigate the cause for declaring  
**Production of Sugar.** sugar to be food, the more we come to the conclusion that this has been brought about in a time when people looked for a vegetable food. This change, which was more or less caused by the Darwinian ideas, came about the middle of the last century. It was the vegetarian who announced the importance of sugar. If certain vegetables really have a high percentage of nutrition, we must not overlook the fact that there are only a few, and that the rest of the vegetables are useful mainly as fuel. Hence, the importance of sugar as a food has really been criminally overestimated.

The sugar of commerce undergoes an extensive chemical process; it should not be confounded with the starch sugar which is found as carbo-hydrates in many plants and which, when boiled (not crystallized), are carbonated in the body. When you take the plant which shows the most sugar—the sugar-beet—we find, on analyzing the same, 79 per cent. of water, 11 per cent. of various acids, which contain neither nitrogen nor carbo-hydrate; 4 per cent. of non-combustible salts, 2 per cent. of combustible salts, 1 per cent. of soluble cellulose, and 3 per cent. nitrogen compositions.

If, therefore, the sugar-beet contains 11 per cent. acid and only 3 per cent. inferior nitrogen combinations, it is evident that the first chemical product, the sugar-juice, is hardly anything else but acid. And furthermore, in the treatment of this juice with carbonic acid and sulphuric acid the 3 per cent. of nitrogen disappears, so that if the juice is crystallized we have nothing but crystallized acid, and this is called sugar. Should we intend to gain from the sugar-beet—almost the same conditions we find in the cane sugar—a material that has only a value as fuel we would have to discover first a process to eliminate the 11 per cent. of acids, and there would scarcely be left so much that 100 beets could furnish as much of carbo-hydrate as one meal of potatoes.

COMBINED WITH METALS.

Non-combustible Salts: Sulphuric acid, phosphoric acid, flouric acid, boric acid, nitric acid.

Combustible Salts: Oxalic acid, citric acid, apple acid.

MAIN ACIDS.

Arabin acid .....	$C_{12} H_{22} O_{11}$
Oxal acid .....	$C_2 H_2 O_4$
Amber acid .....	$C_4 H_6 O_4$
Glutar acid .....	$C_5 H_8 O_4$
Adipin acid .....	$C_6 H_{10} O_4$
Apple acid .....	$C_4 H_6 O_5$
Wine acid .....	$C_4 H_4 O_6$
Oxyglutar acid .....	$C_6 H_8 O_5$
Glycol acid .....	$C_2 H_4 O_3$
Glyoxyl acid .....	$C_2 H_4 O_4$
Aconit acid .....	$C_6 H_6 O_6$
Tricarballoyl acid .....	$C_6 H_8 O_6$
Lemon acid .....	$C_6 H_8 O_7$

It can be seen from this that all other plants which we know as carbo-hydrates have a much greater value, especially for the nutrition for the people, than the sugar-beet. To be sure, some contain sweet sugar-starch, like the carrot, sweet peas and corn, but in this case it acts as carbo-hydrates, the same as in the potato.

The manufacturing of the sugar of commerce shows plainly that it is nothing else but concentrated crystallized acid, which is very dangerous to the general welfare. In former times sugar was so costly that only the wealthy people could buy it (one hundred years ago a pound of sugar cost \$1.25); it was, from the national economic standpoint, of no consequence; but to-day, when sugar has caused through its low price a degeneration of the people, it is time to insist upon a general enlightenment.

It is the duty of the dentist to commence this work of enlightenment, because the dentists are the first ones who see this work of destruction caused by sugar; it is the dentist who must start the fight against sugar, since those who are the protectors of the health of the people are too shortsighted to realize the danger.

We observe the first pathological changes caused by sugar in the mouth. I would like to ask why a person has great pain when sugar comes in contact with a tooth not protected by enamel, but otherwise

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healthy. This is caused by a chemical process brought about by the sugar coming in contact with the saliva. This chemical combination is like lactic acid and has similar effects.

In the mouths of sugar eaters, and especially confectioners, we find the awful effects of sugar. Wherever there is the slightest defect in the enamel, the tooth becomes softened; although not carious and not infected, yet it begins to decalcify. This is a sure sign that the sugar has extracted the calcarious salts. It is to be expected after such softening, and in the favorable conditions of the mouth, that caries will follow very quickly.

### Effects of Sugar in the Stomach.

After noting the destructive action of sugar in the mouth, we may look at the effects of sugar and sugar acid upon the stomach, when this sugar acid is formed in the mouth. If sugar causes such a powerful combination of acids it is to be expected that there will be an increase of the muriatic acid in the saliva, even though to a minimum extent. When the sugar and sugar acid reach the stomach, where there are greater quantities of strong muriatic acid, we have an immense quantity of acids in the stomach, which necessarily cause a heavy loss of vitality. This must be true because, instead of supplying the stomach with nutrition, it is filled with a caustic, which attacks the epithelium of the stomach and intestines, and the damage is greater because the acid in the stomach is stronger, and the epithelial lining is, of course, less resistant than the teeth. It is therefore not strange that the tremendous modern use of sugar has brought about an entirely new list of diseases. Some people claim that they must eat sugar to feel well; but we must not forget that in 75 per cent. of people the saliva has an acid reaction, and only 25 per cent. an alkaline. These latter do not suffer so much from the use of sugar.

Dr. William Woodbury, of Boston, Mass., states in *Dental Hygiene*: "The fact that dental decay is far more common with civilized man than in uncivilized man or brute creation is the weightiest of evidence that there is something wrong with what men eat." That these words of Dr. Woodbury allude to sugar we can see from the statistics of consumption of sugar in America. In the year 1907 over five hundred millions of dollars were expended for sugar in the United States, not counting the sugar used to adulterate the various kinds of food.

The elementary significance of these facts for the great civilized countries may be recognized from the further facts that the consumption of sugar, and not of the purest either, among the laboring class of great cities has enormously increased. For instance, if we pass through the streets of the East Side of New York we find in every fifth house a



candy store and at every corner a candy dealer. All these are patronized by the children of the laboring class. It is impossible to produce a strong labor contingent if children, instead of eating wholesome bread, which is cheaper and nourishing, have their infantile digestion ruined by the acids of the candies. How can a laboring man obtain the necessary energy and strength by putting acids into his stomach? How can a man who does mental labor get mental energy if he, instead of being well nourished, suffers in consequence of acids in the stomach? What made it possible for the great men of ancient times to show their strength? It was simple and inexpensive food; sugar was too expensive at that time for the intellectual lights. The loss of energy through the consumption of sugar in the last century and the first decade of this century can never be made good, as it has left its marks on the different races and nations. Where the nourishment is not the correct one and causes destruction, there can be no progress, but degeneration follows. Alcohol has been consumed for thousands of years, but has not caused the degeneration of a whole race. Alcohol does not contain destructive acids. What has been destroyed by sugar is lost and cannot be regenerated. Alcohol is eliminated by the respiratory organs and the epidermis. No wonder that a certain candy manufacturer has spent one million dollars for the cause of temperance, since he expected an increase of the consumption of candy.

The highest civilization already bears the elements of degeneration. If sugar destroys the energy, sugar is the direct cause of degeneration; the indirect cause is the gunner, the money-maker who does not care if he gets his money by handing out a poison to the people.

Civilization means progress; progress we only can gain by health, energy and power. Health, energy and power can only be acquired by partaking of proper food. Sugar is no food whatever, therefore sugar is an enemy of civilization; it is a chemical product which ruins the most important tools and the main machinery for the digestion of food.

If the above facts be true, every one who desires to be an honest citizen, working for the welfare of the race and for the progress of the country, must join the battle of the right and attack the lie which declares that sugar is beneficial.

## The Everyday Use of the X-Ray in Dentistry.

BY C. MAURICE PEABODY, D.D.S.

*Read before the Central Dental Association of Northern New Jersey.*

Years ago, I had as a friend and companion one of those men to whom a machine seems a living thing, and whose business was to repair the heavy and complicated machinery used in the cotton mills of New England, when the mill mechanics could not make the wheels turn as they should.

He was what you might call a "Doctor of Machinery," and his work was carried out in the same spirit as that of the successful physician of to-day. He loved to take a machine, which was suffering from an obscure ailment, make his diagnosis, and then administer the proper treatment.

I went with him one day to one of the big print works, where one of the sets of rolls had an obscure malady which defied the efforts of the regular mechanics, and obstinately refused to do its work.

He started up the machine, felt its pulse, listened to the sounds coming out of it as a doctor would to the respiration, and called the foreman of the room and gave him some instructions which at the time seemed to have nothing to do with the particular trouble, and then sat down on a box and whittled a stick until the instructions were carried out without seeming to have any interest in what the workmen were doing until things had been fixed to his liking, when he started up the machine, and everything worked smoothly.

As we were leaving the room the foreman came along and said, "How in blazes do you do it? We have spent a week on the old machine, without getting anything done, and you come in here and in half an hour you have the machine running." My friend's reply was brief and to the point, and has always stuck to me and been the basic principle of my work as a dentist. It was this: "First find out what is the matter, then fix it."

My attention was first called to the usefulness of the X-Ray in dentistry by the work of Dr. Tousey, and I realized that to remedy many of the ailments which present to the dentist, the finding out of what is the matter is by far the most difficult problem, and as the radiograph many times shows us just what is the matter, I made up my mind that I needed an X-Ray outfit, and I proceeded to get it.

As I had an elementary electrical training, and was something of a photographer, I soon mastered the technique of making a readable radiograph, and to-day I use the radiograph as a routine part of my examination, and will leave it to the accompanying illustrations of two sets of films to speak for themselves.

These two cases are taken at random from my files, and I assure you that while they are of such a nature as to illustrate the usefulness of the radiograph as a diagnostic help, they were the only means of finding out what was wrong, and of deciding what was to be done to remedy the trouble, and I have many more cases in which I should have been at a loss to know how to proceed, if I had not at first found out "what was the matter."



FIG. 1

FIG. 2

FIG. 3

FIG. 4

#### Case 1.

Patient presented with a sinus discharging under the lip. Bridge set on lateral incisor and bicuspid with cuspid dummy. Set with gutta-

percha.

This patient gave a history of never having lost the first dentition; said that she wanted to have teeth of her own as long as possible, and begged me to save this root at any reasonable expense.

Now, of course, any competent dentist could treat and heal an alveolar abscess, and would at once assure the patient that, barring accidents and the unforeseen, this tooth would soon be in as good condition as any pulpless tooth could be, and would probably do its work for years.

Upon inspecting radiograph No. 1 (Fig. 1), I found a piece of a gutta-percha point forced through the apex, and upon showing it to the patient, she submitted to an operation for its removal, which seemed to be easy to any operator familiar with the Schamburg burr.

Film No. 2 (Fig. 2) shows how much of that small piece of gutta-percha I removed, and, of course, I had to go in again and get the rest of it, as shown in Fig. 3, which shows a small piece still there. Again I

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went after that little fragment and got it dislodged as shown in Fig. 4, when I took a small curette and scraped it out. This time I saw it, and knew that I had it, so, of course, no other radiograph was necessary. After this the wound healed uneventfully, the bridge was reset, and is to-day doing good service a year after the operation.

Could this work have been done intelligently without the aid of the X-Ray, and would I have ever discovered the cause of the trouble? Let the little pictures answer the question.

Patient sent in by her physician for X-Ray examination.

**Case 2.** Sinus discharging pus in mouth, and considerable discharge in the nose. Had been treated by her dentist for necrosis

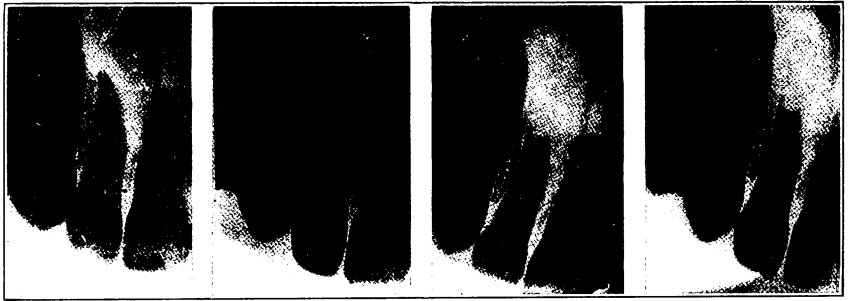


FIG. 5

FIG. 6

FIG. 7

FIG. 8

of the jaw bone for several months, and as there was no improvement, had consulted her physician, who, after seeing radiograph (Fig. 5), asked me to take charge of the case and save the tooth if possible. It looked rather hopeless, but as the patient was a good-looking young woman, and the loss of that tooth meant the breaking up of an otherwise complete denture, I undertook it with misgivings as to the outcome. Fig. 5 shows a piece of a broach in the tooth.

Upon removing a cotton dressing from the canal, I had no difficulty in passing a smooth broach through the tooth, and upon injecting bismuth paste, I located a puncture through the side of the root just back of the apex, as shown in Fig. 6.

After spending many a weary hour in trying to get that piece of broach, I cut the apex back to the region of the puncture as shown in Fig. 7, and pushed the remaining piece of steel through into the wound, where I caught it with a magnet, and reamed the canal to a symmetrical

shape, which was filled with a Taggart casting of lead, set with eucapercha, as shown in Fig. 8, and after allowing it to set for several days, I smoothed off the end of the root, burnished the exposed surface of lead, and after ten weeks had the satisfaction of seeing the wound close from the bottom.

The X-Ray will find out what is the matter for you in many such cases, and your ingenuity as dental surgeons will teach you how to treat it, and if you never find out what is the matter, you will surely never have a chance to properly treat.

"Extract the tooth and put in a bridge, it is easier!" I hear some of my readers say. How about that tooth that it is absolutely necessary to save, if you are to put in that bridge?

The X-Ray is to-day often the court of last resort in surgery, and in dentistry it is the one diagnostic agent which stands out above all others when supplemented with a knowledge of anatomy and pathology.

Why not "First find out what is the matter, then fix it," as a matter of routine practice, instead of using an agent of such power only occasionally.

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## Artificial Enamel.

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BY DR. C. O. RHEA, Nashville, Tenn.

*Read before the Tennessee State Dental Association, May 18, 1910.*

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In presenting to the Tennessee State Dental Association this paper on Artificial Enamel, it is not my object to describe any startling results, or to note any remarkable discoveries concerning these silicate cements.

Dr. S. J. Spence, of Chattanooga, in an article written in 1906 on this material, said: "If I were writing a sermon, my text would be: "Prove all things; hold fast that which is good." When artificial enamel first attracted the attention of the dental profession, some five or six years ago, it was taken up and lauded by the egotist, disregarded by the fogies, and handled with the utmost precaution by the more conservative. Time has given us sufficient opportunity to prove some things concerning it, and it is my object in this paper, not so much to tell what I have proven, but to invoke a discussion from the Society, which will give testimony as to what has been proven by the profession.

There are on the market many silicate cements, the four most im-

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portant of which are Ascher's Artificial Enamel, Dr. Schonbeck's Silicate Cement, Astral, and Harvardid Improved. Innumerable papers have been written, hundreds of tests have been performed, both in and out of the mouth, by eminent scientists and chemists to prove the properties of these materials. Tables have been made as to the relative strength, adhesion, shrinkage, loss in weight, absorbent properties, resistance to wear, and, in fact, almost every test that can be conceived of which would prove anything in a theoretical way. I have found by careful comparison of these tests, that it depends on who is doing the testing, and which cement they are boosting, as to which makes the best showing in tests. This is particularly true of Ascher's Artificial Enamel, tested by Dr. Max Kulka, of Germany, and Dr. Schonbeck's Silicate Cement, tested by C. L. Bostie, of England.

All these exhaustive tests prove but little of a timely beneficial character to us as practitioners, for true it is, "The proof of the pudding is in the eating thereof."

My experience has been exclusively with Ascher's Enamel, and it is this material to which I wish to confine my remarks. My experience has covered a period of three years of conservative use and close observation as to the properties, peculiarities and possibilities of this cement, and while I have had failures, I can enumerate many successful operations in fillings that have stood for two and three years, and which are to-day holding the tooth in a perfect state of preservation, maintaining its bright translucent color, and giving a natural and pleasing effect to its wearer.

It is beyond a doubt that every practitioner of this day has read the directions for mixing and inserting artificial enamel, and have put them into effect to the best of their understanding, and that some have discarded it as worthless in their hands, while others hold to it, pronouncing it good for some cases, but not applicable in all conditions.

Time will not permit going deep enough into this subject to enumerate all factors that might cause failure, or to state every requisite to success, but I wish to point out a few things that might be beneficial to some one.

### **Appropriate Cavities for Silicate Cement.**

The teeth in which it is indicated, and where best results are obtained, are the centrals, laterals and cuspids, in mesial, distal and gingival cavities, which may involve a good portion of the labial or lingual surface, but do not involve the incisal edge.

Cavities should be prepared exactly as for gold fillings, with the exception of beveled margins, containing sufficient under-cuts, and in such a manner that direct force into all portions of the cavity can be obtained, as in the insertion of gold.

In the posterior teeth, never insert it into an occlusal surface cavity with a shallow or even a medium step, for the result in these cases is usually a fracture separating the portion overlying the step, from the body of the filling. I do not think it possesses sufficient edge strength to be a success in morsal cavities; gold fillings and gold inlays are preferable. In the restoration of badly broken down incisors, involving the incisal edge, I would suggest that this material, inlayed into the labial surface of a gold inlay, is a most efficient and artistic method of restoration.

#### **Mixing.**

It is necessary in the mixing of this cement to have every instrument scrupulously clean. A non-metallic spatula must be used, made of bone, ivory or agate. Metal instruments have been very effectually used in my hands in packing the material into the cavity. Metallic instruments discolor the enamel, not by any action of the acid on the metal, but by friction with the fine grit in the powder, the metal is worn into the mix; but the friction need be very slight in packing into a cavity.

#### **Finishing.**

The finishing must not be done with metallic instruments. Celluloid strips placed between the teeth and after insertion, burnished over the filling is a most effective method of condensing into the cavity, and leaves the filling with the glossy surface. Glycerine used on these strips will prevent adhesion. The rubber dam must, in the majority of cases, be placed before inserting a filling. Dry the cavity with alcohol and hot air.

After the filling has been inserted, and the margins finished as neatly as possible, comes the most critical part of the operation, namely, keeping the filling dry during a sufficient length of time to insure setting. Directions say fifteen to twenty minutes. Well, we are in a hurry, operation is finished, patient anxious to get the rubber dam off, other patients in the reception-room waiting; all impatient and time flies. We guess at fifteen minutes, which in reality was five minutes, pull off the rubber dam, and all is ruined. Right here I offer a suggestion which I believe is the secret of success.

#### **Method of Filling.**

In making your mix, when it is of the proper consistency, roll it beneath your spatula on the slab into a little roll about the size of a match and as long as the bulk of the material will permit. Attach the spatula to one end and insert into the cavity from the other. When the cavity is filled, lay the excess beside your open watch on the bracket, noting the time when inserted, finish the filling as rapidly as possible with instruments and celluloid strips. Wait fifteen minutes by

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your time-piece, and in order to test the condition of your filling, break a small amount from the piece on your bracket and put it into the mouth. You will find that it has a strong, acid taste, and that the surface will become soft and chalky. Why? It has not set. Should your filling become moist at this moment, it will be materially impaired. Allow five or ten minutes longer, repeat the test, and you will find an improvement, but not yet having reached a state where saliva will not affect it. Cover your filling with melted yellow beeswax, preferable to paraffin, on account of its adhesive properties. Clip the rubber dam beneath the teeth, should it be an approximal cavity, and remove. The filling, if necessary, may be finished with fine discs and strips, just prior to doing this, but preferably at a later sitting should there be one.

In the early stages of setting, heat will hasten the setting, but it is claimed by experimentors that it impairs the material. After twenty minutes the heat evolved chemically has about subsided, and the additional heat applied through the wax will not damage it. The little pieces of excess, before mentioned, if preserved, serve as excellent shade guides for future use.

It will be found that when the material has entirely hardened, it is free from taste and produces the sensation of a piece of china when brought in contact with the teeth, a condition which is not reached before one or two hours after the material has been mixed, depending on the consistency of the mix, temperature, and the character of the mixing fluid; that from a fresh bottle will set more quickly than that from one almost used up.

And now, in conclusion, I will give you a few things that it is not well to do.

Don't use a metal spatula.

Don't use vaseline on instruments.

Don't prescribe a carbolic mouth-wash to be used on artificial enamel fillings.

Don't attempt to insert a number of fillings with one mix.

Don't depend on adhesion to hold your fillings in.

Don't over-estimate the edge strength of your material.

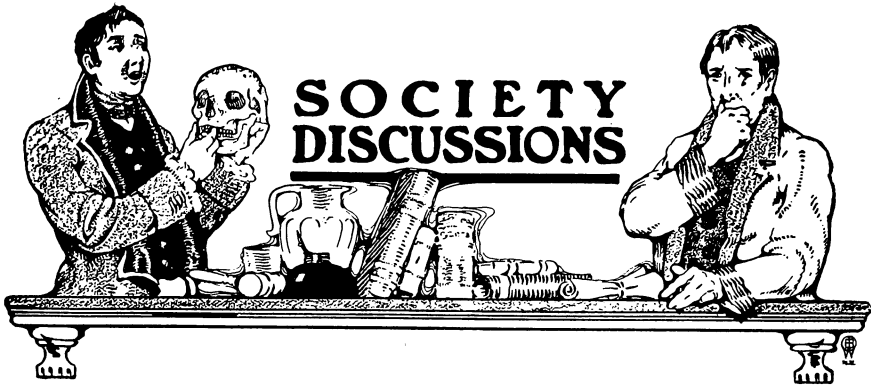
Don't guess at the time for your fillings to set.

Don't believe your filling will do if it gets wet.

Don't be discouraged with failures, and last, but not least,

Don't under-estimate the value of your operation.





## New Jersey State Dental Society.

### Discussion of Dr. Roessler's Paper.

The subject is somewhat new to me, although I have had some experience with sugar, and have made use of it all my life. It may be something which will injure the civilization of our country, but I think I shall continue to use it for some time to come.

**Dr. D. C. Baker.** I have been very much pleased to listen to the paper, but I am not a candy eater myself, and therefore am not a judge of the results, and shall feel safe to continue my use of sugar, which is very limited, being applied to tea and coffee.

**Dr. C. W. F. Holbrook.** I approach the discussion of this paper with hesitation. I think Dr. Roessler has sounded a warning which should have been heard long ago. The consumption of sugar in the civilized world has increased to such an extent that it has come to be recognized as a food, and yet it does a great deal of harm. Sugar is food undoubtedly in the form of carbo-hydrates, but not in the form in which it is consumed in this country, especially as candy. Dr. Roessler speaks of alcohol in connection with sugar, and I think there is another question which will be well worth studying. Alcohol has been condemned as bringing on degeneration of all kinds, and yet, as he has stated in his paper, we have no instances in modern history, nor in ancient history, where any nation has degenerated through the use of alcohol. I think it is a great deal better to take in the carbo-hydrates that we need, as we find them in the vegetables, and especially in the fats.

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There is no need of using sugar as we do, except for gratifying the taste for sweets. Dr. Roessler, just before he wrote his paper, obtained a report which is in German, and he did not trust himself to a translation of it, and asked me to do so for him. The laboratory of National Hygiene in England (which is of very high reputation), with the idea of establishing the fact that alcohol degenerates, and has its degeneration portrayed in the offspring, made experiments and found the facts to be just the contrary; that the children of parents who use alcohol in moderate quantities, in whiskey or beer, have more vitality than those of total abstainers. When we come to consider that alcohol, in the light form in which we get it in wine and beer, contains a great deal of sugar, and becomes a food in that way, we can perhaps see that there is some truth in the assertion. I am not experienced enough to know that, and these are questions that must be left to experts, and actual experiments will not always give true results.

But I think Dr. Roessler has given us a paper which is almost revolutionary; in fact, I was quite alarmed when he started to do it. I think there is a great deal in it which the dentists should consider, and if we can inaugurate a campaign against sugar, we will not do any harm to civilization.

I wish personally to thank Dr. Roessler for his paper, and while it may be somewhat revolutionary and startling, yet his arguments show that he knows his chemistry.

**A Member.**

A man in the laboratory conducts experiments in glass and porcelain vessels, and we do not consider enough the vital, physiological elements that enter into the problem; that is, we do not get the same reaction in the human body that we do in the glass and the porcelain of the laboratory.

The formula given of the main acids leads us to another thought: every practitioner in dentistry has often noticed that the real good boy, the one that does not use alcohol nor dissipate, and who has no bad habits, has the most decayed teeth. Is it not possible that these people are intense sugar eaters? We know there is something in the human system, a craving which, if it is not satisfied, generally demands sugar, and is it not a fact that those men and women who will not use alcohol, are great consumers of sugar, and does not that explain how these worthy and good young men have such bad teeth, and has not Dr. Roessler brought out new facts of which we never have taken cognizance before?

If Dr. Bonwill were alive he would laugh with glee to hear this paper, for he was constantly speaking against the evil of sugar eating. I know Dr. Roessler must have studied this subject from the chemical standpoint, and

I know very little about it from that point of view; we, as dentists, only know about it from clinical experience. I have had the opportunity of studying three different families who are engaged in the manufacture and sale of sugar or candy. One of these families has seven members, and for two of the young women I did the best work I possibly could to save the teeth, covering a period of fifteen or twenty years, without success. The male members of the family all had artificial teeth. They had working for them in the city of Newark three journeymen, one a young man who had good teeth when he went to work for them, and in four years they all had to be extracted, because sugar had made such inroads upon them. One of the men explained to me that during the boiling of the sugar there is a vapor given off, and when they are using what is called confectioners' sugar, there is a dust floating about which enters the nose and mouth and nostrils, and affects the teeth. I had two other families of candy makers in which the same condition existed.

I think my friend, Dr. Roessler, must have been in touch with my old perceptor, who for years preached the doctrine of the terrible effects of sugar; more than once has he made the statement that sugar has caused infinitely more trouble in this world than alcohol, and he went even further and said that more than ninety-nine per cent. of all the ills that human flesh is heir to are caused by the use of sugar. I am not prepared to go as far as that in my statement, but from my experience I do really believe that the use of sugar is very injurious to the human system, not only in its destruction of tooth tissues, but also in the degeneration of the human body, and while I am not prepared to live up wholly to my conviction, and give up entirely the use of sugar, yet I do think that a more moderate use of it would be beneficial.

I desire to express my appreciation of the paper, which I think is very timely, but at the same time I do not believe all the statements.

I remember some years ago Dr. Talbot read a paper on autointoxication as a cause of pyorrhea alveolaris, indicating that it is caused in that way, and that invariably there is found the presence of sugar in the urine, and he indicated that was the poison that was doing the work, and by eliminating the sugar he got rid of many of the symptoms and effected a great many cures of pyorrhea. I would like a little more information from Dr. Roessler on the subject.

I have listened with pleasure to the paper, but it is one that should be examined with a careful spirit, though not necessarily with criticism. Dr. Roessler stated at one point, "I would like to ask why a person has great pain when

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sugar comes in contact with a tooth not protected by enamel, but otherwise healthy," and he says, "This is caused by a chemical process brought about by the sugar coming in contact with the saliva. This chemical combination is like lactic acid, and has similar effects."

I think Dr. Roessler is in error here, for this reason: We all know we have in the mouth, especially on the surfaces of the teeth, exposure of the dentinal fibrillae, and it is not necessary even for it to have contact with sugar to give pain. If you apply glycerine, or any combination containing glycerine, at such a point, you will produce pain. If you simply touch it with an instrument you will cause pain, and that means simply that the dentinal fibrillae are exposed at that point, and not that there is a chemical reaction from the sugar. I am perfectly convinced that that is an error. Dr. Roessler further says: "In the mouths of sugar eaters, and especially confectioners, we find the awful effects of sugar. Wherever there is the slightest defect in the enamel, the tooth becomes softened; although not carious and not infected, yet it begins to decalcify. This is a sure sign that the sugar has extracted the calcarious salts. It is to be expected after such softening, and in the favorable conditions of the mouth, that caries will follow very quickly."

I think that also is an error. In the first place, we have learned that caries is not due to an acid; it is due primarily to a collection of bacteria in situations favorable to them, and every practitioner has seen hundreds of cases even in well-kept mouths. In that situation the bacteria absorbs the carbo-hydrate of food. We have sugar and starch that is changed into lactic acid, which decalcifies the tooth.

He says: "Whenever there is the slightest defect in the enamel, the tooth becomes softened, although not carious;" that might occur, but only under extraordinary conditions, where there might be a saturation of the saliva with acid. But caries does not follow the softening of the tooth structure by sugar, primarily. The softening of the tooth structure is a part of the carious process, and after that softening, the bacteria make little openings in the enamel, and the process is then repeated, again and again; the dentine, of course, is decalcified, but it is by the product of the bacteria, and after that the bacteria enter.

In the past, sugar has been considered a food, and I do not think there is any question but that in the future it will continue to be considered so to a certain extent. There is no doubt that in the past alcohol has been considered a food, but that idea is being abandoned now, and it is regarded as a depressant. There are many men who claim that the ordinary diet of to-day is poisonous, and some go so far as to say that we should live on pie, fruit and nuts only. Those are questions which are open to discussion. As I understand it, sugar taken into the mouth is

## SOCIETY DISCUSSIONS

changed into glucose, and the glucose is taken into the system as such; starch taken into the mouth is changed to glucose in the intestinal canal, and is taken up into the blood, and becomes a part of the necessary food of the system. The proteids, if there be too much absorbed, and the person lives a sedentary life, will become a surplus of material which the body cannot easily get rid of, and the eliminating organs become overworked, and illness follows.

I desire to express appreciation of Dr. Roessler's effort; it certainly is an important paper, but I desire to look for the truth from another standpoint.

I believe that an honest criticism is the test of true friendship.

Dr. Inglis has brought up a point that I had noted myself, and I think his point in reference to sensitive teeth is well taken.

Some twenty-five or thirty years ago the late Professor Flagg, combatting the theory that sugar or candy is deleterious to the longevity of teeth, selected certain patients, and prescribed a definite quantity of sugar, and found that an ordinary use of sugar, or candy, had no injurious effect whatever on the teeth. But chemistry and physiology have proved that an undue quantity of a great many things will make trouble. The danger is in the abuse. Everything is relative; it is relative in the use of sugar and of alcohol, and I have even known people to get too much religion; it set them crazy after a while. With an undue quantity of sugar taken into the stomach, investigations made twenty or thirty years ago proved that the system would not properly utilize the bone-forming elements, the proteids; there is something in the sugar that prevents the system from utilizing the bone-forming elements. That is perhaps just as true to-day. But here is another point. The essayist says: "Dr. William Woodbury, of Boston, Mass., states in *Dental Hygiene*: 'The fact that dental decay is far more common with civilized man than in uncivilized man, or brute creation, is the weightiest of evidence that there is something wrong with what men eat.'"

In my humble opinion that is only part of the trouble; it is not alone what a man eats, but what he does. We are in what we call civilization, but the logician well may ask, is it civilization, is it advancement? Certainly the average civilized nation to-day is not living in a manner conducive to health from a mere physical standpoint. Why blame sugar for that, and why should Dr. Woodbury (who is a personal friend of mine) say that something is wrong with what men eat? That is only part of the problem.

Dr. Roessler says that we find no nation that has been degenerated by the use of alcohol. I believe the essayist will admit that the heavy

## ITEMS OF INTEREST

spirits, we now use when drinking whiskey, did not originate until about the sixteenth century. The average whiskey, served over the bar of the average hotel, contains eighty-five per cent. of alcohol, but previous to the sixteenth century we had only the alcohol of fermentation of vinous liquor, which did not exceed seventeen per cent., and light wines, which only contained six or seven per cent. Previous to that time a man, in order to get eighty-five per cent. of alcohol, would have to drink a very large quantity of vinous liquor, but he can now get it in a very few minutes. There is a difference between the present and the past. Then again we have beer, which I do not think goes back of the fourteenth century, so that the ancient races had no heavy alcoholic drinks.

The United States Government and other governments have found that a certain ration of candy, issued to the army and navy, has been conducive of good results, in the line of health, and they have considered a certain quantity of sugar in the form of candy to be a food.

If sugar is so injurious to the human system, why is it that all through the South to-day, and perhaps for the last ten years, the food of the mules and horses, used on the plantations, consists principally of sugar? They feed them a mixture of ordinary molasses and grain, and find they can get per horse power, relatively as much, if not more service out of the horses and mules than they did years ago, when they were fed on grain and other expensive foods. The horses have not degenerated, and their teeth have not degenerated. •

Dr. Roessler says: "What made it possible for the great men of ancient times to show their strength? It was simple and inexpensive food." I do not think it was that alone; it was their way of living, and civilization has done away with a great many old-time methods of life.

So I contend there are certain statements made by the essayist that, from a clinical standpoint especially, and from the standpoint of history, will stand investigation. I appreciate the paper, and think it is one that should produce a great deal of thought and interest.

I desire to congratulate the doctor on his paper.

**Dr. W. W. Hawke.** Undoubtedly we all have seen, as Dr. Meeker has mentioned, the bad effect of the excessive use of sugar. Only a few years ago we had brought to our meeting at Asbury Park a child that had been brought up on condensed milk, which contains a great deal of sugar, and whose teeth were all level with the gum, and the child was suffering from a very badly disordered stomach. Three or four physicians had been treating the child unsuccessfully. I told the mother that in my mind the trouble was caused by the excessive use of

## SOCIETY DISCUSSIONS

sugar in the condensed milk, and advised her to give cow's milk or other milk. Dr. Lennox Curtis also gave her the same advice.

We repeatedly see cases of children, who have been candy eaters from their earliest infancy, and I believe that a person who uses sugar in excess is bound to have more or less trouble with the teeth, and if with the teeth, why not with the other organs of the body?

On the other hand, while I have never advocated the use of liquor, yet in all fairness I must say that I have observed that men who consume more or less liquor, and take ordinarily good care of themselves, are more apt to be free from dental trouble than some others.

I should be very sorry to have the impression go out that sugar is harmful, and that alcohol is not. I would prefer that people should lose all their teeth from the effects of sugar than see the dreadful ravages that are caused by the use of alcohol. There is nothing in the world to-day doing the harm that alcohol is.

I congratulate Dr. Roessler on this paper. A few years ago I met Dr. Roessler at a banquet, where the subject of sugar was discussed, and ever since then I have taken a great deal of interest in this particular subject.

In the city of Council Bluffs, in Iowa, where I was located, there are several large sugar manufacturing plants, and I believe that there are more people in that city suffering with carious teeth than anywhere else in the world, and it is almost impossible to save the teeth of those employed by the candy concerns.

Concerning the remarks of the gentleman who referred to sugar causing pain, and asserted it was not the cause of a chemical reaction, as I said in my paper, he says the cause of the pain is an irritation such as is caused when the tooth is touched by an instrument, or by glycerine or one of its derivatives. I want to ask him why does not potato, bread or other food have the same effect, if that be true? It must be remembered, too, that glycerine contains mineral acid, which of itself would have a different effect on the tooth-structure from food, so that is hardly a fair illustration. Furthermore, when a dentist touches a tooth with an instrument, he makes pressure, and that is not a mere touching. The same gentleman said that bacteria softened the enamel, while I said it was the acid which is formed by the sugar in the mouth, and then after the tooth has been softened by sugar the bacteria find the field prepared. Bacteria in the mouth, as

## ITEMS OF INTEREST

Professor Miller, of Berlin, has stated, do not soften the teeth initially; they cannot produce an acid strong enough to do that. They are the cause of caries, perhaps, but before they can cause caries, the field must be prepared for them, and that is what sugar does.

Concerning Dr. Flannagan's remarks, as to too much of anything causing trouble, it must be remembered that manufactured sugar is the concentrated article, and the sugar of commerce is entirely "too much," no matter how little you take of it. The sugars provided by nature in fruits, starch, etc., are in a form which is not harmful, but when we take the concentrated product, the sugar now commonly in use, no matter how little we take of it we still take too much. Dr. Flannagan says that what we eat is only partially the cause of the trouble. The difficulty is that what we eat is the main trouble, for all ailments are derived from mistakes in selecting food. He speaks of horses, and it must be borne in mind that if a horse is properly fed he will give the full amount of power that can be expected from such an animal, but if poorly, improperly or imperfectly fed, but little power is had in return. Concerning Dr. Flannagan's remarks with reference to alcohol, it must be remembered that I spoke of its use as food, and as such it was used in the time of the ancients, of which I spoke. Dr. Flannagan is not, perhaps, entirely informed as to the date of the introduction of beer and other alcoholic liquors, for some two thousand years ago, when the Romans conquered the different tribes inhabiting the southern part of Germany, they there found in use a beer known as "Hirsetrau," and another known as "Meth," which latter was made out of honey. As to the use of sugar in the army and navy, of this and other countries, a full investigation of the facts will show that it has never been used in the army of the United States; that some five or six years ago the experiment was tried in the German army, and it was abandoned after some six months. It may be interesting in this connection to note that not until after sugar was so used in the army was there any necessity for army dentists, but since that time their services have been constantly required. Concerning the feeding of horses in the South, it is not the concentrated sugar of commerce that is given them, but the cane that remains after the sugar has been extracted, in the course of which extraction the injurious ingredients referred to in my paper are removed.

As to Dr. Stockton's remark, it must be remembered that the teeth are the most important tools in the whole human system, and when once destroyed cannot be restored except by artificial dentures, but one who uses alcohol to excess can be cured, if the proper method of cure is followed. Instead of fines or imprisonment, which, after all, are as much punishment of those depending upon the transgressor as of himself, if



the ancient form of corporal punishment, the whipping and flogging of the wrongdoer was enforced, there would very soon be a considerable decrease in the excessive use of liquor.

In conclusion, I desire to thank the speakers for the kind way in which they have treated my paper.

On motion, adjourned until 8:30 p. m.

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## Central Dental Association of Northern New Jersey.

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A regular monthly meeting of the Central Dental Association of Northern New Jersey was held at Davis's Parlors, Newark, New Jersey, on Monday, April 18, 1910.

President Harlan called the meeting to order. The Secretary called the roll and a quorum was found to be present. The Secretary then read the minutes of the annual meeting and of the March meeting, which were approved as read.

On motion, consideration of the proposed amendments was laid over until the next meeting.

The President introduced Dr. C. Maurice Peabody, of South Orange, N. J., who gave an address upon the usefulness of the X-ray in dentistry, illustrated by numerous slides, which Dr. Peabody explained to the members of the association.

### Discussion of Dr. Peabody's Address.

I greatly appreciate Dr. Peabody's demonstration and I think we owe him a great deal for showing us how practical and simple this work is.

It is quite indispensable in root and canal work and obscure conditions of the mouth, and I can add nothing to what he has said except to indorse what he has told you.

All of us should, and probably will, in the near future avail ourselves of the information that the X-ray will give us.

I have not done any X-ray work whatever, but it seems to me this is a great object lesson to us.

**Dr. Jones.**

We all know there are many cases which could be successfully treated if we had view of the conditions and this seems to be the means to get knowledge of conditions which we could learn of in no other way.

## ITEMS OF INTEREST

**Dr. Chayes.** Dr. Peabody has thoroughly demonstrated the fact that if we could see ourselves as others see us, we would very often have different notions concerning our work. We should have examinations of this kind made in many cases for, as Dr. Peabody has said, there is no other means of knowing just what we are doing in root canal work. Unless the case is radiographed, we cannot tell exactly what confronts us before we start.

One important feature about this work is that up to the present time it has been rather expensive and many of our patients are not in a position to have their mouths radiographed. When you think of a patient paying probably ten dollars to have the entire root canal treatment done and then having to pay fifteen dollars for a radiograph to find out whether the work has been done properly, it becomes a somewhat expensive proposition. However, I believe we have a wizard in our midst. Dr. Peabody has been perfecting this work until he is in a position to bring it within the reach of the average pocketbook. I have seen some of his work besides what he has shown here to-night, and I do not think I am misstating the fact when I say that, at least in my opinion, he knows more about the physical properties of the X-ray than any other man in New Jersey and, I may add, a great many in New York.

I hope he will be in a position shortly to bring this subject before us in a series of papers, for the more light there can be thrown upon the X-ray the easier will it be for the dentist to practice his profession, not merely for the money there is in it, but in the interest of patients.

I make it a rule to have my work radiographed as frequently as circumstances will permit and it has been a very great aid in my work.

**Dr. Peabody.** Dr. Chayes suggested that this subject be brought forward in a series of papers. That idea had not occurred to me before, but if there are any members of this association who have had an electrical training, or who want to study this subject, it will give me great pleasure to bring it before them and show them what can be done with a very simple apparatus in the way of dental radiography.

It is not necessary to invest a couple of thousand dollars in a radiograph plant in order to do just as good work as I have shown to-night. Fortunately I have an expensive plant, although I did not buy it myself.

These pictures are made in my laboratory in a tenth of a second, and there is no reason why they cannot be made in ten seconds, in any man's office, with apparatus that can be secured at a reasonable cost.

It will probably never be the custom for every dentist to do his own radiographic work. There will be certain men with a natural bent

## SOCIETY DISCUSSIONS

for such work, who will do it for others, as well as for themselves.

I have no sympathy with the specialist who charges fifteen dollars for a dental radiograph. It may be worth it to the millionaire patient, but for the ordinary patient it is impossible, for it requires several of these little pictures during the course of the treatment, and it should be possible to make a thorough X-ray examination of any of these conditions for a very much smaller sum.

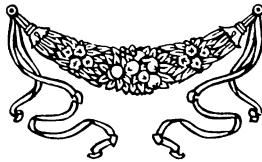
If any of you are interested in this work I should be glad to see you in my laboratory at South Orange and to show you what I can, and give any help possible.

I am going into dental radiography deeper every day and making a study of the properties of the X-ray, and I think I am already in a position to show any man who can understand electrical measurements how he can do this work in a very short time.

On motion, a vote of thanks was extended to Dr. Peabody for his very able address.

The President called attention to the recent death of Dr. Palmer, an honorary member of this society and a former President of the State society, and said he would appoint a committee to procure resolutions on his death.

On motion, adjourned.





### **The Prosthodontist.**

At the first autumn meeting of the Second District Dental Society, of New York, Dr. Prothero, of Chicago, delivered a highly scientific and entertaining lecture, in which he pointed out the advantages of determining with exactness the path of the condyle when arranging a full upper denture. At the same meeting it was announced that in December the essayist would be Dr. William H. Taggart. Dr. Taggart, we were told, has been applying himself to the problem of overcoming many of the difficulties which have been encountered by all who have undertaken the casting of gold. We were informed that Dr. Taggart has invented several contrivances with the aid of which he has reduced the art of casting almost to an exact science. He will exhibit and demonstrate these devices at the December meeting of this society, after which date prosthetic dentistry, especially, will have taken one more step in advance.

On the night after the Second District meeting, Dr. J. Leon Williams addressed a large audience at the meeting of the First District Society. On that occasion Dr. Williams made a plea for higher ideals in artificial



teeth, and in the articulation of the same. He pointed out the great dissimilarity which exists between the natural organs and the artificial substitutes offered for sale at dental depots. Dr. Williams hopes to improve this by creating better tooth forms. On the same evening he exhibited and explained the new anatomical articulator of Gysi, which seems to be an improvement on all that we have yet had.

At this meeting it was announced that Dr. Hart J. Goslee, of Chicago, would be the essayist for November, and would lecture upon the application of the casting process to crown and bridgework. Also, that Dr. Peeso would conduct a post-graduate course in crown and bridgework under the auspices of the society.

A week later, at the first meeting of the Central Dental Association of Northern New Jersey, Dr. F. T. Van Woert delivered a clinical lecture in which he explained his new and remarkable method of making a hand-carved, all porcelain crown, for any given case, producing his result at a single fusing. By Dr. Van Woert's method the shrinkage of porcelain is reduced to one-tenth, and knowing this, with the aid of ingenious calipers of his own invention, the prosthetic artist is enabled to produce a crown of the exact dimensions required.

In the October number of *ITEMS OF INTEREST*, Dr. Chayes criticised existing conditions resulting from haphazard practices in crown and bridgework, and in this issue he begins a series of papers in which he will endeavor to erect more exact, more geometrical, more anatomical and consequently more artistic methods of procedure.

All of which causes the writer to be slightly retrospective.

**The Dawn of  
Prosthodontia.**

In September, 1899, we presented to the dental world the word "prosthodontia" in a special number exclusively devoted to this branch of dental art. Glancing back over that number, it seems most fitting that the opening article should bear the title, "The Scientific Articulation of the Human Teeth as Founded on Geometrical, Mathematical and Mechanical Laws," by W. G. A. Bonwill. It was a sad fact that in the very next number of *ITEMS OF INTEREST* we were obliged to announce the death of this man who had done so much to dignify the mechanical side of dentistry. But it has always been an intense gratification to the

## ITEMS OF INTEREST

writer, that before his death we had given his work that full and complete publication which had been refused to him in other quarters.

The same special number contains another article by Bonwill describing his method of constructing removable clasp dentures. There is also an interesting paper by Hart J. Goslee, who, since that time, has done so much to bring crown and bridgework, from a chaotic jumble of individual choice of individual methods, to something more in accord with the system and methods of a true art. These, with the other articles then published, renders that special number a fair reflection of prosthetic dental art of that period.

The following is an extract from the editorial:

**Extract from  
Editorial  
of Sept., 1899.**

"Dentistry was surely born of a mechanic mother, with an artist for the father. We have always chosen to ignore this mother, and even in the earliest periods we reckoned dentistry as one of the arts. Now we look higher and call it one of the learned professions, of which heretofore there were but three. As we have drifted away from our parentage, we have ever resented names attributed to us which remind us that we are mechanics. Nothing exasperates us more than to hear others call us 'tooth carpenters.' Long ago we discarded the words 'Mechanical Dentistry,' substituting the more high-sounding phrase 'Prosthetic Dentistry.' Certain of us dislike the mechanic side of our calling so much that they have devoted themselves exclusively to 'Operative Dentistry,' and would almost feel demeaned if it were thought that their 'mechanical work' were done with their own hands. These wish it distinctly understood that that branch of their labors is relegated to the 'hired man in the laboratory.' These men have at last grown so dignified and self-respecting that nowadays they call themselves 'Stomatologists.'

"Why this feeling against mechanics? It requires a great deal of brain to know what is mechanical, and a great deal of skill to apply the knowledge so that the result will be the highest mechanical achievement. Moreover, in spite of all the antipathy and disdain which is felt towards the mechanical side of our profession, it is exactly that side which has made the greatest progress during the past quarter of a century.



"It is noteworthy that the only specialty in dentistry which is universally recognized under a special name, orthodontia, is really more mechanical than operative, to return momentarily to the old terms. Yet the specialist in orthodontia is rightly proud of his success in his chosen work, and would be quite astonished to be told that he were less important than the stomatologist.

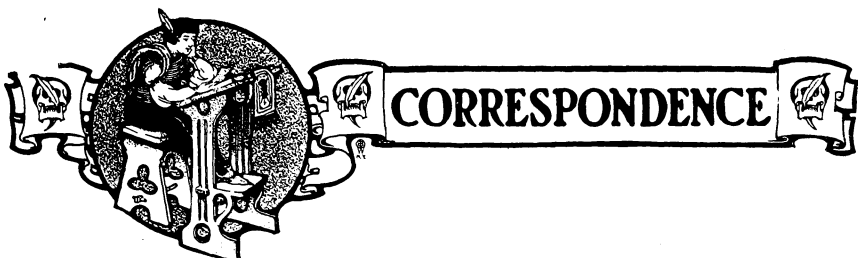
"Since there is so much in a name, and since, after all, mechanics is the foundation rock upon which must rest the glorious palace of dentistry, may it not be possible to rid ourselves of the prejudice against 'mechanical dentistry' by adopting for it a title which would bestow upon it that dignity which some seem to think it lacks?

"It is with this object that this special number of ITEMS OF INTEREST has been made up, and in offering it to the profession we venture to suggest that hereafter we allude to mechanical dentistry as prosthodontia, the derivation of which is analogous to orthodontia."

**The Prosthodontist  
the Coming Specialist  
in Dentistry.**

Since the above lines were penned, what was there alluded to as the "specialist in orthodontia" has considerably changed. In those days, the orthodontist was a general practitioner of dentistry, who devoted especial attention to orthodontia. To-day we have the exclusive specialist, the orthodontist, who practices nothing but orthodontia. Another dental specialist coming into vogue is the man who is restricting his practice to "prophylaxis." A few call themselves "prophylacticists," a name which probably will never be popular. Other special fields of work are attracting the exclusive attention of enthusiasts, and with the profession thus doomed to division into specialties, it is not difficult to foresee the early arrival of the "prosthodontist."

It is but eleven years since we suggested the word prosthodontia, and in that time tremendous strides have been made. In another decade it is more than probable that the construction of artificial substitutes for the natural organs will have grown into an art demanding such skill that men will be proud to write after their names, "Prosthodontist."



## Opening for Dental Interne.

October 7, 1910.

*Editor* ITEMS OF INTEREST:

Dear Doctor:—The following letter speaks for itself: I will be pleased to hear from any qualified young man who would like a year's hospital experience. The opportunity for all kinds of dental operations, save gold fillings and porcelain work, is very unusual.

Besides the usual dental operations, Bellevue Dental Department calls for fractures of the jaw, tumors of the mouth, etc., thus giving a young man an opportunity to obtain experience along lines that cover the whole field of oral surgery. Applicants must be qualified or able to qualify to practice dentistry in New York State.

Very truly,

HERBERT L. WHEELER.

12 West Forty-sixth St., New York.

September 23, 1910.

DR. HERBERT L. WHEELER,  
12 West Forty-sixth St.,  
New York City.

Dear Sir:—The Trustees have, upon the recommendation of the Medical Board, resolved to appoint a dental interne at Bellevue Hospital, as suggested by you. Will you kindly recommend a competent dentist to fill the place, and advise us what steps are necessary on our part to get the place established.

Very truly yours,

L. K. PAULDING, Secretary,  
Board of Trustees.





## Replacing Fractured Facings.

*Editor* ITEMS OF INTEREST:

Dear Sir:—My attention has been called to the article "Replacing Fractured Facings," by Dr. George H. Koegler, in your issue of September last.

The method, so far as porcelain facings are concerned, was described by me in an article published in the 1907 volume of *ITEMS OF INTEREST*, entitled "Repairing Fractured Crown and Bridge Facings, New Method."

Dr. Koegler says: "I have used the above method for about two years and find the facings hold." He will be interested to know that I recently had an opportunity of examining the first case I treated in this way some nine years ago. The facing was apparently as secure as on the day on which it was fixed.

I would suggest to him as an additional precaution that it is desirable to slightly undercut the portion of facing immediately over the pins with a suitably shaped instrument charged with diamond dust.

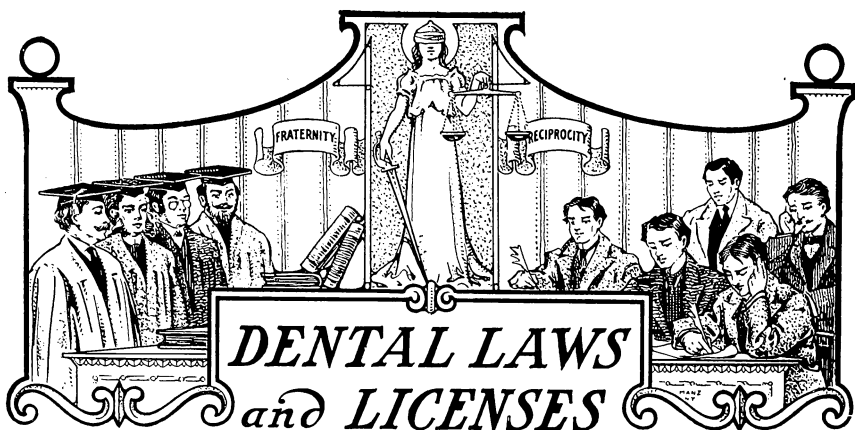
I am, sir,

Faithfully yours,

W. FRANCIS MELLERSH.

28 Wimpole St., W., London, England.





## License Requirements. Dominion of Canada.

Dental Association of the Province of Alberta.

**Alberta.** Board of Directors: Dr. A. D. Callum, President, Calgary; Dr. J. S. Stewart, Vice-President, Lethbridge; Dr. H. F. Whittaker, Secretary-Treasurer and Registrar, Edmonton; Dr. W. A. Hicks, Calgary; Dr. A. E. Aunger, Lacombe.

The Directors meet second Monday in January and July of each year for examination and other business. For further particulars, address Dr. H. F. Whittaker, Secretary-Registrar, Edmonton, Canada.

The graduates of the following colleges of dentistry, upon complying with the provisions of By-Law 8, are eligible for final examinations: University of Pennsylvania, Chicago College of Dental Surgery, New York College of Dental Surgery, Tufts College Dental School, Philadelphia Dental College, Pennsylvania Dental College, Baltimore College of Dental Surgery, Pittsburg Dental College, Buffalo Dental College, New York Dental School, Northwestern University Dental School, Michigan University Dental College, Western Reserve Dental College."

### Dental Law of Alberta.

"The matriculation or preliminary examination as provided in the fifteenth section of this Act shall be passed by all students prior to entering into articles of indenture with a licentiate of dentistry, provided that a certificate from any recognized University of the Dominion of Canada that the intending student has been matriculated according to the curriculum of any such University, or a certificate from the Department of Education

## ITEMS OF INTEREST

that the candidate has a standing equal to that required for second-class non-professional certificates of teachers, shall be taken in lieu of the matriculation or preliminary examination aforesaid. The commencement of the term of any articulated student shall date from the signing of his articles as aforesaid."

**Clause 20.** "The following persons, upon the payment of the required fees, shall be entitled to receive certificates of license to practice dentistry in this Province from the Board of Directors of said Association, namely: (a) Any person who is a graduate of any school or college of dentistry, or a member of any dental association recognized by order in council as hereinafter provided, and produces sufficient evidence of identity, and fulfils the qualifications prescribed for students to indentureship, and passes the final examination prescribed for the admission of students to practice."

(b) "At any time after the passing of this Act the Lieutenant-Governor may, by order in the Council, set forth and declare the names of such schools, colleges and associations, the graduates of which shall be entitled to receive certificates of license as aforesaid, and may, at any time by further order in Council, recognize any other school, college or association, or rescind any former order in Council recognizing any such school, college or association, and until an order in Council is passed refusing recognition to any school of dentistry of any of the Provinces of the Dominion of Canada having authority by law to grant certificates of license or diplomas to practice dentistry, or any association or school having like powers in the United Kingdom of Great Britain and Ireland, any graduate or member of any such school or association who passes the final examination prescribed for admission of students to practice shall be entitled to receive a certificate of license as aforesaid."

(c) "The Board of Directors shall have power to appoint one or more members of the association as representatives of the association upon the Dominion Dental Council, and the Board shall, so long as represented on the said Council, accept the certificate of qualification of the said Dominion Dental Council as a qualification sufficient without further examination for the granting to the holder thereof of a license to practice dentistry in the Province of Alberta, provided such certificate is accompanied by satisfactory evidence of the good moral character of the applicant."

CAMDEN, N. J., Sept. 23, 1910.

The above quotations from the Dental Law of Alberta will furnish some desired information, and we trust correct any erroneous impression in regard to it.

ALPHONSO IRWIN, D.D.S.



### Illinois State Board of Dental Examiners.

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The semi-annual meeting of the Illinois State Board of Dental Examiners for the examination of applications for a license to practice dentistry in the State of Illinois will be held at the University of Illinois (Dental Department), corner Harrison and Monroe Streets, beginning Monday, November 7, 1910, at 9 a. m.

"The following preliminary qualifications shall be required of candidates to entitle them to examination by this Board for a license to practice dentistry in the State of Illinois: Graduates of a reputable dental or medical school or college, or dental department of a reputable university, who enter the school or college as freshmen on or after the school year 1906-7, must have a minimum preliminary education of not less than graduation from an accredited high school or a certificate from the State Superintendent of Public Instruction, equivalent officer or deputy, acting within his proper or legal jurisdiction, showing that the applicant had an education equal to that obtained in an accredited high school; which certificate shall be accepted in lieu of a high school diploma." Candidates will be furnished with proper blanks and such other information as is necessary on application to the secretary. All applications must be filed with the secretary five (5) days prior to date of examination. The examination fee is twenty dollars (\$20.00), with an additional fee of five dollars (\$5.00) for a license. Address all communications to

T. A. BROADBENT, Secretary.

705 Venetian Building, Chicago, Ill.



## **Ohio State Dental Society.**

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The forty-fifth annual session of the Ohio State Dental Society will be held in Columbus on December 6, 7 and 8, 1910. The Great Southern Hotel will be headquarters, as heretofore, but additional space will be available, giving more room for the meetings of the Society and the clinics, which of late years have been so much overcrowded.

Come and hear a symposium on the physiology and pathology of the sockets and gums by men of wide reputation:

Dr. M. H. Fletcher, the president, on "Reparative Powers of Cementum."

"Physiology and Anatomy of the Gums and Sockets," by an essayist yet to be selected.

Dr. T. B. Hartzell, of Minneapolis, on "Infection and Pathology of the Gums and Sockets."

Dr. N. S. Hoff, of Ann Arbor, on "Instrumentation and Medication of Gums and Sockets."

Dr. Joseph Head, of Philadelphia, on "Prophylaxis of Gums and Sockets."

Dr. S. L. McCurdy, of Pittsburg, on "Extended Diseases of the Sockets and Bones; Surgical Treatment."

These papers, with the clinics along the same line, will afford an invaluable course of instruction in the cause and treatment of these diseases.

The numerous other clinics, covering the entire range of dental practice, will contain many features of value to everyone.

Mark the dates in your appointment book and come to another of those big meetings of the Ohio State Dental Society.

F. R. CHAPMAN, Secretary.

305 Schultz Building, Columbus, Ohio.

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## **Arizona State Dental Society.**

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The second annual meeting of the Arizona State Dental Society will be held in Phoenix, November 10, 11, 12. All ethical dentists are cordially invited.

H. H. BRAXTAN,

Phoenix, Ariz.

Secretary.



## **Seventh and Eighth District Dental Societies of the State of New York.**

The annual joint meeting of the Seventh and Eighth District Dental Societies of the State of New York will be held at Rochester in the Hotel Seneca on November 10, 11, 12, 1910.

An especially good program has been prepared. All ethical dentists are invited to attend these meetings.

GEORGE C. LOWE, Rec. Secretary.

Rochester, N. Y.

## **Idaho State Board of Dental Examiners.**

The next meeting of the Idaho State Board of Dental Examiners will be held in Boise, January 2, 3, 4, 1911. No special examination granted to practitioners. Examination fee is \$25.00. For further information address

B. M. BROOKFIELD,

Idaho Falls, Idaho.

Secretary.

## **Iowa Board of Dental Examiners.**

The Iowa State Board will hold a meeting for the examination of candidates for license to practice dentistry in Iowa, beginning December 5, 1910, at 9:00 a. m., in Des Moines.

For blanks and other information write the secretary.

E. D. BROWER.

Le Mars, Iowa.

## **Rhode Island Board of Registration in Dentistry.**

The Rhode Island Board of Registration in Dentistry will meet for the examination of candidates at the State House, Providence, R. I., Wednesday, Thursday and Friday, December 28, 29 and 30, 1910. Application blanks and particulars may be obtained from

H. L. GRANT, Secretary.

1025 Banigan Building, 10 Weybosset Street,  
Providence, R. I.



## **Committees Appointed on the National Association of Dental Examiners for 1910-11.**

### **Committee on Colleges.**

F. A. Shotwell, D.D.S. (Chairman).....Rogersville, Tenn.  
Thomas J. Barrett, D.D.S.....Worcester, Mass.,  
James F. Gilbert, D.D.S.....Woonsocket, R. I.

### **Tabulating Committee.**

Thomas A. Broadbent, D.D.S. (Chairman).....Chicago, Ill.  
F. H. Sutherland, D.D.S.....Denver, Col.  
Forrest G. Eddy, D.M.D.....Providence, R. I.

### **Joint Tabulating Committee of the N. H. D. E. and N. H. D. F.**

John F. Dowsley, D.D.S. (Chairman) for N.A.D.E.,  
175 Tremont St., Boston, Mass.  
Thomas A. Broadbent, M.S., D.D.....Chicago, Ill.  
F. A. Shotwell, D.D.S.....Rogersville, Tenn.

### **Joint Conference Committee Composed of Five Members Each of the N. H. D. E. and N. H. D. F. and National Dental Associations.**

Charles P. Pruyn, D.D.S. (Chairman).....92 State St., Chicago, Ill.  
George E. Mitchell, D.D.S.....Haverhill, Mass.  
Forrest G. Eddy, D.M.D.....Providence, R. I.  
W. C. Deane, D.D.S.....New York City, N. Y.  
Frank O. Hetrick, D.D.S.....Ottawa, Kansas

### **Publication Committee.**

J. B. Stiff, D.D.S. (Chairman).....Fredericksburg, Va.  
Edgar A. Honey, D.D.S.....Kalamazoo, Mich.  
Aphonso Irwin, D.D.S.....Camden, N. J.

### **Committee to Investigate Status and Rights of the N. H. D. E.**

F. H. Lyder, D.D.S. (Chairman).....Akron, Ohio  
G. O. Orr, D.D.S.....Jordan, Minn.  
W. G. Dalrymple, D.D.S.....Ogden, Utah

### **Committee on Revision of Constitution of National Dental Association.**

Charles A. Meeker, D.D.S. (Chairman)....29 Fulton St., Newark, N. J.

# ITEMS OF INTEREST

## **Committee Urging National Dental Association to have Date of Meeting after August 1st of each Year.**

Charles A. Meeker, D.D.S. (Chairman).....Newark, N. J.  
 Charles P. Pruyn, D.D.S.....Chicago, Ill.  
 A. C. Wherry, D.D.S.....Salt Lake City, Utah

## **Committee on Resolutions of Demise of Dennis F. Reece, M.D., D.D.S.**

Thomas J. Barrett, D.D.S. (Chairman).....Worcester, Mass.  
 George E. Mitchell, D.D.S.....Haverhill, Mass.  
 Charles A. Meeker, D.D.S.....Newark, N. J.

## **Committee on Resolution of George H. Colcomb, D.D.S.**

C. Victor Vignes, D.D.S. (Chairman).....New Orleans, La.  
 F. A. Shotwell, D.D.S.....Rogersville, Tenn.  
 J. A. Hall, D.D.S.....Collinsville, Ala.

## **Committee on Credentials.**

Charles F. Ladd, D.D.S.....Lincoln, Neb.  
 J. A. Lentz, D.D.S.....Phoenix, Ariz.  
 E. D. Brower, D.D.S.....Le Mars, Iowa

## **Committee for Promoting a System of Uniform Examinations.**

Thomas E. Turner, D.D.S. (Chairman)....721 Olive St., St. Louis, Mo.  
 H. S. Sutphen, D.D.S.....Newark, N. J.  
 George C. Marlow, D.D.S.....Lancaster, Wis.

## **Committee on Contracts and Accommodations.**

Charles A. Meeker, D.D.S. (Chairman).....Newark, N. J.

## **Committee on Resolutions.**

G. F. Ambrose, D.D.S. (Chairman).....Eldorado, Kan.  
 J. A. West, D.D.S.....Des Moines, Iowa  
 Samuel G. Duff, D.D.S.....Greenville, Tex.

## **Committee on Codification of Dental Laws.**

F. H. Lyder, D.D.S. (Chairman).....Akron, Ohio  
 J. A. Hall, D.D.S.....Collinsville, Ala.  
 C. Victor Vignes, D.D.S.....New Orleans, La.

## **Committee on Revision of Standing Rules and Regulations.**

Charles P. Pruyn, D.D.S. (Chairman).....82 State St., Chicago, Ill.  
 C. Victor Vignes, D.D.S.....New Orleans, La.  
 C. S. Parker, D.D.S.....Norfolk, Neb.